Democracy Manifest:
Essays in Historical Political Economy

by

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Acknowledgments

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Declarations

The material in this thesis has not been submitted for a degree at any other university. Chapters 1 and 2 are my own, single-authored work. Chapter 3 is collaborative work with Sascha O. Becker, Andreas Ferrara and Luigi Pascali.

Abstract

This thesis consists of three chapters. While the chapters address distinct questions using different historical settings, and as such should be read as independent pieces of research, some commonalities can be identified. The chapters share the overarching themes of democratisation and the functioning of early democracies. In their combination of historical data and modern econometric techniques, the three chapters additionally have a common methodological foundation. Finally, though these chapters are works of economic history, it has been my goal throughout to not lose sight of questions of interest within economics more broadly conceived.

In the first chapter, I examine how interaction costs shape the diffusion of social movements. During the thirty-year period 1881-1910, Swedish society underwent two transformative developments: the large-scale roll-out of a national railway network and the nascence of social movements which came to dominate social and political spheres well into the twentieth century. Using event-study and instrumental variables methodologies, I document the causal impact of proximity to the newly constructed railway network on the spread and growth of membership in these social movements. Well-connected municipalities were more likely to host a local movement organisation and saw more rapid growth of membership per capita. By reducing least-cost distances between municipalities, railways intensified the influence exerted by neighbouring concentrations of membership, thereby enabling spatial diffusion.

What determines the efficacy of identity-based propaganda, and how long-lasting are its effects? In the second chapter, I shed light on these questions by studying the impact of the Swedish *State Institute for Race Biology's* popularisation of race biology on right-wing ideology in the short and long run. In a popular book edition of its systematic classification of the Swedish population according to "Nordic purity", the *Institute* identified particularly "pure" areas of the country. Implementing a differences-in-differences strategy, I document the effect of the publication on right-wing ideology: following the publication, election districts of above-median "purity" exhibit a 3.4 percentage point relative increase in the vote share of right-wing parties. This effect is concentrated in areas with little immigration, suggesting that insular communities may be particularly susceptible to this type of racial rhetoric. Finally, the rightward turn appears to persist over time: present-day municipalities in formerly above-median "purity" regions exhibit a higher relative vote share for the Sweden Democrats, a populist party with roots in the extreme right.

In the third chapter, which is joint work with Sascha O. Becker, Andreas Ferrara and Luigi Pascali, we study the effect of warfare on the development of state capacity and representative institutions using novel data on cities and territories in the German lands between 1200 and 1750. More specifically, we show that cities with a higher conflict exposure establish more sophisticated tax systems, and also develop larger councils, councils that are more likely to be elected by citizens, and more likely to be independent of other local institutions. These results are consistent with the idea of a trade-off between more efficient taxation and power sharing proposed in earlier work. We make headway on establishing a causal role of wars by using changes to German nobles' positions within the European nobility network to instrument for conflict.

Chapter 1

Mobility and Mobilisation:

Railways and the Spread of Social Movements

1.1 Introduction

Social movements can be powerful forces for change. In the context of European democratisation, grassroots pressure on elites was instrumental to an extension of the franchise (Aidt and Jensen (2014), Aidt and Franck (2015)). Collective action has the power to end absolutist monarchies, as in Denmark during the upheavals of 1848, and topple economic systems, as in the case of the abolition of Austrian and Hungarian serfdom (Stearns, 1974). More recently, grassroot-level political organisation was crucial for the successes of the Civil Rights Movement (Morris, 1986) and for popular mobilisation during the Arab Spring (Beinin and Vairel, 2013).

Despite the importance of social movements in shaping societal, political and economic developments, many questions remain open about the nature of their

This chapter has benefited greatly from discussions with Sascha O. Becker, Kerstin Enflo, James Fenske and Noam Yuchtman. Participants at CAGE AMES Seminar (Warwick), ASREC Europe Conference (Luxembourg), Sound Economic History Workshop (Gothenburg), the Workshop on Urban, Regional and International Economics (Southern Denmark), the Oxford-Warwick-LSE Economic History Workshop (Warwick), the Graduate Seminar in Economic History (London School of Economics), the Workshop on Political Economy (ifo Dresden), the Workshop on Culture and Comparative Development (Luxembourg) and the RES Ph.D. Meeting (Westminster Business School) provided valuable comments.

evolution and spread. In theories of collective behaviour, the organisation of individuals with mutual interests is key (Olson (1965), Tilly (1978)), and relies on information about the actions of others (Granovetter (1978), Jackson and Yariv (2007)). Facilitating communication between agents in such models, however, need not necessarily lead to better mobilisation outcomes (Gould (1993), Hassanpour (2014)). The question therefore naturally arises: how do reductions in the cost of interactions between individuals shape the spread and growth of a movement, and what are the mechanisms underlying this social contagion of ideas? Further, to the extent that the goals of disparate organisations do not perfectly align, there is scope for competition between movements (Axelrod (1997), McAdam (2010)). How are strategic interrelationships between different movements shaped by the technologies underpinning social interactions?

These are questions which I seek to answer in this chapter, taking a natural experiment from Swedish history as a testing ground. In the period 1881-1910, the large-scale roll-out of a national railway network radically transformed Swedish society (Heckscher, 1907), with the total length of the network increasing from 6,000 kilometres in 1881 to 14,000 in 1910 (Kungliga järnvägsstyrelsen, 1956). At the same time, nascent social movements emerged which came to define the Swedish economic, social and political fabric at least until the Second World War (Lundkvist, 1977). These movements included a rich network of leftist organisations and labour unions, as well as free churches and temperance movements. By 1910, their combined membership was 700,000 from a population of approximately 5.5 million (Andrae and Lundkvist, 1998). Combining these concurrent developments, I study how the large decrease in travel costs granted by the railway system facilitated the diffusion of these movements.

I use rich historical data, combined from several sources, to construct a panel covering more than two thousand municipalities over the thirty-year period 1881-1910. I reconstruct the Swedish railway network and measure each municipality's access to rail each year based on historical railway maps. I combine this with detailed data on social movements from the Swedish Social Movements Archive (Andrae and Lundkvist, 1998), covering the yearly presence and membership of various groups in each municipality. Finally, I supplement these data with full-count censuses as well as a host of geographical data.

Equipped with this dataset, I estimate the causal effect of improved railway access on the spread of social movements using two main empirical frameworks. First, I use an event-study approach to estimate the effect of the arrival of rail in the proximity of a municipality. Second, I implement an instrumental variables strategy in which I use proximity to initial proposals for the railway network to instrument for actual proximity to rail.[1] I document the crucial role played by improvements in transportation infrastructure in shaping the diffusion of social movements on both extensive and intensive margins. Following a reduction in the distance between a municipality and the railway network, the probability that a movement spreads to the municipality increases, the growth in membership and the number of distinct organisations per capita rises, and the concentration of membership within a single group decreases.

To explore the mechanisms underlying this result, I operationalise a "market access" framework inspired by Donaldson and Hornbeck (2016). The movement membership in a given municipality can be thought of as a travel cost-weighted function of movement membership in other municipalities. I show that as travel costs decrease due to railway expansion, access to and influence from social movements in nearby municipalities intensifies, which facilitates diffusion. This effective shrinking of distance to nearby movement membership is robust to accounting for more traditional population-weighted measures of market potential. I supplement this analysis with station-level data to demonstrate that the spread of social movements is predicted by passenger arrivals in a municipality but not by freight arrivals.

[1]This instrument was first used by Berger and Enflo (2017), and is explained at length in Section 1.4.

The contagion effect therefore is one driven by the mobility of individuals, and not by local economic activity more broadly.

Finally, given the richness of my data, I am able to investigate the interrelationships between different types of movements. I document strong complementarities between temperance and free church organisations, while labour unions and leftist parties act as substitutes for temperance movements. Temperance organisations were often religiously motivated, and were therefore “crowded in” by the presence of free church organisations. The political goals of labour organisations, however, were sometimes misaligned with those of the temperance movement. Their presence in a municipality, therefore, worsened the prospect of entry for temperance organisations. The latter substitutability disappears completely with improvements in railway access, which suggests that facilitating interactions between individuals weakens the ability of incumbent organisations to prevent entry of potentially opposing groups.

This chapter is related to recent work by García-Jimeno et al. (2018), who document the role of information diffusion in shaping collective action during the U.S. Temperance Crusade of 1873-1874. They find that social interactions drive the diffusion of protests against liquor dealers, and highlight complementarities between railway and telegraph technologies. Their analysis takes these networks as given, and identification derives from temporary closures of the network due to strikes and accidents. I take an extensive-margin approach, and exploit the construction of new railway lines. This difference speaks to the conceptual distinction between diffusion (spread along existing network ties) and brokerage (spread along newly created network ties) drawn by McAdam (2003). In this terminology, García-Jimeno et al. (2018) speak to diffusion, whereas my identification comes from brokerage.

My focus on the transmission of ideas via railway technology, abstracting from pre-existing postal and telegraph communications, is appropriate for the brokerage setting. The establishment of new network ties and the spread of movements along these newly formed ties required a level of in-person interaction infeasible by post or telegraph. Indeed, personal visits were key for spreading the word of the new movements, as noted by Lundkvist (1977). In this period, the mobility granted by rail transformed both economy and society beyond existing communication technologies (Heckscher, 1906). In this chapter, I document its crucial role in the spread of the ideas embodied in the fledgling social movements.

Another distinction between this chapter and the paper of García-Jimeno et al. (2018) is the nature of the data used. The protest event data used by García-Jimeno et al. (2018) is ideal for studying short, intense periods of collective action, whereas the systematic membership data employed here is better suited for studying the evolution of involvement in social movements over several decades. In addition, I observe data for a menu of different social movements, which allows me to study the strategic interactions between these movements directly. As such, while the present work and that of García-Jimeno et al. (2018) are similar in setting and underlying conceptual frameworks, they speak to different aspects of the same social interactions and how improvements in technology shape these interactions.

Social movements, and the spread of ideas more broadly defined, have received considerable attention in the economics, sociology and political science literatures. Charles Tilly provided an early abstract conceptualisation of the conditions under which social movements can successfully mobilise and reach political goals by way of collective action (Tilly, 1978). Organisation is key to mobilisation: the existence of networks connecting individuals with shared characteristics or interests is crucial to establish "groupness". Improvements in transportation infrastructure can aid the diffusion of social movements by facilitating the formation of such networks.

It is well-understood that ideas spread by popular movements can have far-reaching economic, social and political consequences. As noted above, the grassroots threat of revolution was instrumental in Europe's democratisation period (Aidt and Franck, 2015). The movement of people and ideas is crucial for growth, as demonstrated by Andersen and Dalgaard (2011) in their study of temporary cross-border flows of people. The existence of dense networks of social capital need not necessarily have positive outcomes, however, as noted by Satyanath et al. (2017) in their study of the role of grassroots social clubs in aiding the rise of Nazism in Germany.

Nevertheless, social movements are key transmitters of ideas, and therefore the technology by which ideas spread plays a crucial role in the movements' success. In the modern era, the availability of information and communication technology shapes patterns of political mobilisation (Manacorda and Tesei (2018), Campante et al. (2017), Enikolopov et al. (2017), Acemoglu et al. (2018)). In the Swedish setting, geographic distances between political agents were key for the historical proliferation of labour unions and fledgling social-democratic organisations (Hedström (1994), Hedström et al. (2000)). I argue that by reducing effective distances, the expansion of the railway network facilitated the formation of networks underpinning the organisation and mobilisation of such groups. Increased interconnectedness of actors helped overcome the coordination problems of collective action described theoretically by Olson (1965) and identified experimentally by Cantoni et al. (2019). Railway infrastructure, therefore, is a key technology in the process of transmitting ideas, which shapes the pattern of social movement diffusion. This chapter contributes to our understanding of this pattern of growth by exploiting exogenous variation of railway access to causally estimate its effect on both the intensive and extensive margins of spread. The particular historical setting leveraged here allows me to study the impact of technology on diffusion over several decades, in contrast to existing literature that has focussed on short-run bursts of engagement in social movements.

The study of transportation infrastructure, and of railways in particular, has a long-standing tradition in economics and economic history. In his pathbreaking work, Fogel (1964) introduced a social savings methodology to argue that railways only had a moderate effect on the U.S. agricultural sector. Using a different conceptualisation of social savings, Fishlow (1965) reaches a more optimistic conclusion.[2] In recent years, there has been a renewed interest in the effect of railways on the economy. Inspired by Fogel's early work, Donaldson and Hornbeck (2016) reconsider the impact of railways using modern econometric techniques and GIS methods and provide evidence for their transformational impact on the U.S. agricultural sector.

While the study of the economic impact of railways began with a focus on the U.S., a growing body of work documents the impact of railways on the growth experiences of a range of countries. Studying nineteenth-century Prussia, Hornung (2015) finds that railways were a key driver of urban population growth. Bogart et al. (2018) document the spatial reorganisation of population and occupational distributions triggered by rail in nineteenth-century England and Wales, and argue that the ensuing agglomeration forces fostered further growth. Studying the Kenyan experience, Jedwab et al. (2017) show that the initial spatial equilibrium generated by colonial railways persisted even after the disuse of the colonial railway infrastructure. Closely related to the setting of this chapter, Berger and Enflo (2017) find that railway expansion in nineteenth-century Sweden relocated economic activity and had persistent effects on city growth.

Besides their direct impact on local growth, railways affect a multitude of other facets of economic, political and social life. Perlman (2016) and Andersson et al. (2017) both argue that railway expansion was a key driver of local innovation in the U.S. and in Sweden, respectively. Donaldson (2018) combines archival data with a general equilibrium trade model to show that railways in colonial India substantially decreased trade costs and fostered interregional and international trade, with important effects for real income levels. Railways also enabled greater investments in human capital by increasing the supply of schools, as argued by Atack et al. (2012). It is my aim to improve our understanding of the importance of rail-

[2]Concretely, Fogel (1964) compared the U.S. economy with railways to a counterfactual of extended canal and road networks, whereas Fishlow (1965) used existing alternatives in the antebellum period as the counterfactual.

ways, and of communication technologies more broadly, by using insights from the literature on historical economic geography to study the spatial pattern of social movement diffusion.

In this chapter, I contribute to the body of work assessing the role of technology in shaping social interactions. I do so in a setting that exploits the transformative historical impact of railways in Sweden. The same reductions in effective distances between locations that drove the spatial patterns of economic growth also triggered greater intercommunication between formerly distant places. This increase in connectedness promoted the diffusion of ideas and fundamentally shaped the interactions between disparate groups. Operationalising the particular setting of late-nineteenth century Sweden in a well-identified econometric framework, I document these effects in the salient case of the rise to prominence of Swedish social movements.

1.2 Historical Background

1.2.1 Social Movements in Sweden

Throughout the nineteenth and early twentieth centuries, social movements were an important part of the Swedish social and political fabric. From humble beginnings as local grassroots organisations in the middle of the 1800s, various temperance movements, free church associations, labour unions and leftist parties had grown into potent social forces before the First World War. By 1910, combined membership in these organisations totalled around 700,000, a sizeable figure relative to the total Swedish population of 5.5 million.

These movements played a crucial role in the Swedish democratisation process. Free church and temperance organisations were early to voice grassroots demands for representation and an extension of the franchise. By the beginning of the twentieth century, a significant proportion of the second chamber of parliament were free church or temperance members (Möller, 2015). These groups exhibited significant engagement by women, and were particularly key for the introduction of female suffrage in 1919. Labour organisations such as the unionist movement and early social democratic party organisations also increasingly came to demand extensions of the franchise (Lundkvist, 1977).

An important facet of Swedish social movements in this period is that, while the movements themselves were national in scope, membership tended to be local. That is, local branches could be set up with relative ease, and associations with just a handful of members were relatively common. This means that local engagement can be well-measured by the local presence of or membership in various movements. I discuss measurement in more detail in Section 1.3 below.

1.2.2 The Swedish Railway Network

Swedish transportation infrastructure underwent rapid change in the second half of the nineteenth century. Traditionally, transport had taken place on primitive roads and highly seasonal waterways (Heckscher, 1954). Unpredictable and fragmented pre-railway transportation networks meant that transshipment was frequent and costs were often prohibitively high (Heckscher, 1907). The introduction and rapid roll-out of a national railway network therefore dramatically changed Swedish transportation by offering a faster, higher-frequency option at a lower cost.

Swedish railway construction started relatively late, and the state viewed itself as having a crucial role to play in directing the expansion of the network. To this end, several proposals were made for a "master plan" for the roll-out of rail. The first was put forth in 1845 by Count Adolf von Rosen, who proposed a main trunk line connecting the two largest cities (Stockholm and Gothenburg), with extensions and branches for a national network.

After von Rosen failed to raise enough funds to begin construction, the parliament of 1853/1854 decided that construction of the main trunk lines would be state-financed. A second proposal was made by Colonel Nils Ericson, who was given "dictatorial powers" to route the main lines (Kungliga järnvägsstyrelsen (1906), see Berger and Enflo (2017) for a discussion). These plans aimed to connect major cities and avoided the coast due to military concerns. Despite the significant powers bestowed upon Ericson to draw the plans, they were ultimately rejected in the parliament of 1857. As such, both main proposals ultimately failed. Even so, they greatly informed eventual railway construction.[3]

Railway construction began in 1855, and the first short lines were operational by 1856 (Heckscher, 1954). Following a railway boom in the 1870s, the largest cities in the southern half of the country were connected by 1880. Nevertheless, several economic centres remained unconnected (Berger and Enflo, 2017). Throughout the remainder of the nineteenth and the beginning of the twentieth centuries, there were additional periods of rapid expansion. By the eve of the First World War, the railway network connected all the major population centres, including those in the northern parts of the country. This massive expansion is best summarised in the growth of aggregate railway line length: over the period 1856-1910, the total combined length of the network increased from 66 to 13,829 kilometres.

1.2.3 Railways and the Spread of Social Movements

The large-scale expansion of the railway network had far-reaching effects. Writing in 1906, Eli Heckscher mused on the profound social impact of the large increase in mobility granted by the railway:

> "Travel has been extended to infinitely wider strata of the population ... in contrast with the past, transport has an apparent democratising effect in the present." [4]

[3] These plans can therefore be used as instruments for actual railways, as in Berger and Enflo (2017) and Andersson et al. (2017). I discuss this instrumental variables strategy in depth in Section 1.4 below.

[4] Quotation from Heckscher (1906). Author's translation. Original text: "resandet har ut-

One facet of the "democratising effect" of rail is the facilitation of the spread of ideas and popular engagement with them. Hedström (1994) notes the crucial role of distance between actors in the diffusion of Swedish trade unionism, and Hedström et al. (2000) stress the importance of the existence of "mesolevel" networks between disparate groups of actors for the geographic spread of early social democracy. In particular, the ability of individual actors to travel was key in spreading the word of new ideas and movements:

> "The channels of communication for the new [ideas] were primarily personal visits by colporteurs, preachers, agitators and others." [5]

In the Swedish case, the expansion of the railway network reduced effective distances, increased the mobility of individuals and facilitated the formation of mesolevel networks, and enabled the spatial diffusion of involvement in social movements. It is my objective in the remainder of the chapter to obtain causal estimates of the impact of rail on the spread and diffusion of social movements, and to elucidate the mechanisms by which this effect operates.

1.3 Data

The main data set used in this chapter is a panel covering 2,270 Swedish municipalities over the thirty-year period 1881-1910, for a total of 68,100 municipality-year observations. Data on key variables of interest are compiled from a number of sources.

sträckts till oändligt vidare kretsar af folket ... I motsats mot förr verka transportmedlen i nutiden uppenbarligen demokratiserande."

[5]Quotation from Lundkvist (1977). Author's translation. Original text: "Kommunikationskanalerna för det nya var främst pesonliga besök av kolportörer, predikanter, agitatorer och andra."

1.3.1 Data from the Swedish Social Movements Archive

Main outcomes of interest are constructed using the Swedish Social Movements Archive (Andrae and Lundkvist, 1998). The archive is the output of a research project that documents the history of four main social movements: temperance organisations, free churches, unions and left party organisations. [6] For each organisation, the archive details the municipality where it was seated, its year of foundation and (if applicable) its year of dissolution. In addition, the archive documents the number of members in each organisation on 31 December in each year. From this data, I construct an organisation-year panel that I collapse to a municipality-year panel for my analysis. For each municipality, therefore, I can observe which of the four movement types were present in any given year, their membership figures and the total number of distinct organisations.

I report summary statistics for the social movement data in Panels A and B of Table 1.1 and show aggregate time series of the spread of and membership in each movement type in Figure 1.1. Social movements (of any type) are present in roughly half of municipality-year observations, and this is driven primarily by temperance and free church organisations. Figure 1.1 illustrates this well: temperance and free church organisations were already relatively well established at the start of my sample period, whereas the establishment and diffusion of unions and left party organisations began in earnest in the second half of the 1890s.

Panel B of Table 1.1 reports social movement summary statistics conditional on movement presence. This panel illustrates two things. First, there is significant heterogeneity in movement size across municipalities. Some municipalities have movements with only a handful of members, whereas the larger municipalities can have memberships in the tens of thousands. Similarly for the number of organisations: in some municipalities a movement type is represented by only one organisa-

[6] These left party organisations formed the backbone of the fledgling Social Democratic Party, which was founded in 1889 and became a dominant political force in the early twentieth century.

tion, while in other municipalities many different organisations are active within the same movement type. Second, the panel demonstrates that unions and left parties tend to be larger, on average, than temperance and free church organisations.

1.3.2 Data on the Swedish Railway Network, 1881-1910

The main treatment variables in this chapter are measures of proximity to the railway. To this end, I construct yearly measures of the distance from each municipality to the completed railway network. For each year, I digitise the railway network from maps published in historical accounts by Statistics Sweden (Statistiska Centralbyrån, various years). I then calculate the geodesic distance from the main settlement in each municipality to the nearest completed railway line in each year. The location of the main settlement is a better indicator of where the mass of the population is located than, for example, the centroid of the municipality in computing measures of railway access.

In Figure 1.2, I show the extent of the network at the beginning (1881) and end (1910) of my sample period. I report measures of railway access in Panel C of Table 1.1 and in Figure 1.3. The median distance to rail is decreasing steadily throughout the sample period, while the proportion of municipalities within a reasonable distance of rail is increasing. Aggregate measures disguise substantial heterogeneity: the distance from rail varies from 0 kilometres (for municipalities on a railway line) to over 600 kilometres (for remote northern municipalities before the northward extension of the network).

For the majority of my analysis, I employ an instrumental variables strategy exploiting proximity to initial railway plans to instrument for proximity to realised railway lines. This strategy is inspired by Berger and Enflo (2017) and I collect data on the railway plans from an official publication celebrating the centenary of the Swedish railway (Kungliga järnvägsstyrelsen, 1956). As with the constructed railway lines, I digitise the railway plans and then compute the distance to these plans for each municipality. Maps of the railway plans and their relationship to realised lines are shown in Figure 1.4, and the mean distance to the plans is reported in Panel C of Table 1.1. I discuss the construction of the instrument in more detail in Section 1.4 below.

In my exploration of the mechanisms underlying the positive effect of railway access on social movement diffusion (see Section 1.6), I additionally employ station-level data on passenger and freight arrivals at state-operated stations. Using the same historical documents of Statistics Sweden (Statistiska Centralbyrån, various years), I identify stations associated with the municipalities in my sample and digitise yearly arrivals of passengers and freight. Summary statistics are reported in Panel C of Table 1.1.

1.3.3 Other Data

I collect additional data from various sources. I make use of the full-count censuses of 1880, 1890, 1900 and 1910 (Riksarkivet and Minnesota Population Center, various years) to construct demographic controls and to transform social movement outcomes into per capita measures where appropriate. Since censuses are decadal, I use a constant growth rate interpolation for non-census years.[7]

Lastly, I use topographical data from NASA (2009) and land cover data from Natural Earth (various) to construct various geographical controls, including elevation, distance to coast, distance to nodal municipalities in the railway network and distance to the capital.

1.4 Empirical Framework

To estimate the effect of railway access on the proliferation and growth of social movements, I implement two empirical strategies. The first is an event study design,

[7] This equates to linearly interpolating logged values. I demonstrate in Section 1.5 that my results are robust to other interpolation regimes.

where I explore the impact of the arrival of rail within ten kilometres of a municipality. This exercise motivates the remainder of the analysis by demonstrating that proximity to rail matters for social movement outcomes. The drawback of the event study framework is that the "event" needs to be specified, and any distance cut-off chosen to designate the event is arbitrary.

In the second empirical strategy, therefore, I regress social movement outcomes on the distance to railway directly. Distance to railway is likely to be determined endogenously with social movement outcomes. Bias arising from reverse causality and omitted variables would therefore preclude a causal interpretation of estimates from a simple ordinary least squares (OLS) regression. Hence, I propose an instrumental variables (IV) framework in which I instrument for actual distance to the railway network using distances to initial railway plans. This instrument was first used for the Swedish setting by Berger and Enflo (2017) and later by Andersson et al. (2017). The instrumental variables strategy constitutes the majority of the analysis, and is described in more detail below.

1.4.1 Event Study

The first empirical strategy I employ is a motivating exercise for the remainder of the analysis. I define the arrival of the railway network within ten kilometres of the seat of a municipality as an "event", and explore its impact in a standard event study framework.[8] Formally, the equation I estimate is:

$$\mathrm{Y}_{it} = \alpha_i + \gamma_t + \alpha_i \times t + \sum_{\tau=-5}^{5} \rho_{t+\tau} \mathbb{1}\{\text{Rail within 10km}\}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it} \tag{1.1}$$

In this equation, Y_{it} is a social movement outcome of interest. This could be an indicator for the presence of a movement, a measure of the membership in social

[8] I conduct robustness checks using different distance cut-offs, which I discuss in Section 1.5.

movements or the number of distinct organisations operating within a municipality. The explanatory variable of interest is the indicator $\mathbb{1}\{\text{Rail within 10km}\}_{it}$, which switches on when the railway network first expands to within ten kilometres of a municipality. The sequence of coefficients $\rho_{t+\tau}$ capture the effect of the arrival of rail before and after the event.

The terms α_i and γ_t are municipality and year fixed effects, respectively. The former capture time-invariant municipality-specific effects, while the latter capture year-specific shocks affecting all municipalities equally. In addition, I include municipality-specific linear time trends $\alpha_i \times t$. Finally, the vector of controls X_{it} includes geography and baseline demographic characteristics interacted with year fixed effects, as well as contemporaneous population controls. These controls are discussed in more detail as they are introduced.

Identifying Assumptions

Identification in the event study set up relies on the comparison of the evolution of social movement outcomes in municipalities which experienced the "event" in a particular year to that in municipalities which did not. Crucially, therefore, it must be the case that the two groups of municipalities do not exhibit differential trends prior to the event. Only if the parallel pre-trends assumption is satisfied do the unaffected municipalities constitute valid counterfactuals to the affected ones. I evaluate the credibility of this assumption when presenting my event study results below.

Additionally, to ensure I identify the effect of the railway, no other confounding changes may take place in treated municipalities concurrent with the arrival of rail in their proximity. The event study design is helpful to alleviate such concerns, since different municipalities experience the event at different points in time. Any year-specific confounding effects will therefore be absorbed in the year fixed effects.

1.4.2 Instrumental Variables

The event study strategy outlined above relies on the arbitrary definition of the "event" as the arrival of the railway within ten kilometres of a municipality. To avoid having to make such discrete distinctions, it is possible to regress a social movement outcome Y_{it} on distance to railway $\mathrm{RailDist}_{it}$ directly:

$$\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi\, \mathrm{RailDist}_{it} + \mathrm{X}'_{it}\, \beta + \epsilon_{it} \tag{1.2}$$

As before, α_i and γ_t are municipality and year fixed effects, respectively, and X_{it} is a vector of controls described as they are introduced in the analysis below. The coefficient of interest is ϕ, which captures the effect of distance to rail on a given social movement outcome.

As a concrete example, suppose Y_{it} is an indicator taking a value of one if any social movement is present in municipality i in year t. Suppose further, as indeed will be the case throughout the chapter, that $\mathrm{RailDist}_{it}$ is the inverse hyperbolic sine transformation of the distance (in kilometres) to the nearest part of the railway network.[9] The estimated coefficient ϕ would then capture the increase in the probability that any movement is present that would result from a doubling of the distance to the railway. Theoretically, I expect to find $\phi < 0$. If railways facilitate transportation and interactions between people, then greater access to rail (that is, lower distance to rail) should cause movements to proliferate.

Estimation of equation 1.2 by OLS is unlikely to yield a causal estimate of the effect of rail on social movements for three main reasons. First, reverse causality may generate a spurious relationship between Y_{it} and $\mathrm{RailDist}_{it}$. If local grassroots organisations were successful in lobbying for railway network extensions in their vicinity, then social movements may drive railway proximity and not vice versa.

[9] I use the inverse hyperbolic sine rather than the natural logarithm to allow for zero distances. The interpretation of the estimated coefficients is similar to that of the natural logarithm. See Burbidge et al. (1988) for details. Robustness checks using the natural logarithm are discussed in Section 1.5 and reported in Table 1.12 in Appendix B.

Second, independent of reverse causality, there may be underlying omitted variables driving both social movement activity and railway expansion. If these omitted factors are time-varying, they will not be absorbed by municipality fixed effects. As a concrete example, some municipal leaders are more progressive than others, and may want to foster both local engagement in social movements and better transport connections. This would cause a spurious negative relationship between distance to railway and social movement outcomes even in the absence of a causal impact. Finally, since data on the railway network come from the digitisation of historical maps (as detailed in Section 1.2), measurement error may be a concern. Since errors arising from the digitisation process are likely to be classical, the resulting bias of my coefficient estimates will be towards zero. Such bias would make it more difficult to identify an effect, if it exists.

The three concerns outlined above all suggest the use of an instrument to generate exogenous variation in actual distance to rail. This variation can be used to obtain causal estimates of ϕ in equation 1.2. In particular, I propose to use an instrument first introduced in Berger and Enflo (2017), which exploits the particular history of railway building in Sweden. The essence of the instrument is to use proximity to initial plans of the railway network to predict proximity to the realised network. For historical background on the railway plans, see Section 1.2 above. The precise definition of the instrument as well as a discussion of its validity is provided below.

Formally, RailDist_{it} is instrumented in a first stage equation given by:

$$\text{RailDist}_{it} = \alpha_i + \gamma_t + \sum_d \delta_d \,\text{PlanDist}_i \times \mathbb{1}\{\text{decade} = d\}_t + \text{X}'_{it}\,\beta + \nu_{it} \tag{1.3}$$

The terms α_i, γ_t and X_{it} are municipality fixed effects, year fixed effects and a vector of controls as before. RailDist_{it} is the presumably endogenous distance to the railway network that needs to be instrumented. The variable PlanDist_i is the time-invariant distance to the planned railway network.[10] To use this distance in a panel framework, I interact it with decade fixed effects $\mathbb{1}\{\text{decade} = d\}_t$, taking 1881-1890 as the base decade.[11] The estimated first stage coefficients δ_d should therefore be thought of as the change in the elasticity between planned and realised railway network expansion as the network develops.[12]

The Railway Plan Instrument

As discussed in Section 1.2 above, two main network plans were proposed before railway construction began (the von Rosen plan in 1845 and the Ericson plan in 1854). While these plans were both ultimately abandoned, they are still good predictors of where eventual construction took place. Maps of these plans and their relation to the realised network are presented in Figures 1.4b and 1.4c.

Notably, neither plan made provisions for northward railway expansion, with the drawback that the plans will be relatively worse predictors for actual railways in the northern parts of the country. To overcome this drawback, I make use of the "nodal" destinations targeted in the proposals and construct a set of straight lines connecting these destinations, as shown in Figure 1.4d.[13]

Based on these three counterfactual railway networks, I define my instrument PlanDist_i in the following way:

$$\text{PlanDist}_i = \min\{\text{Dist. von Rosen}_i, \text{Dist. Ericson}_i, \text{Dist. Nodal Lines}_i\}$$

That is, the instrument is the distance of municipality i to the nearest of the

[10] I will take the inverse hyperbolic sine transformation of this distance throughout.
[11] The remaining two decades are therefore 1891-1900 and 1901-1910.
[12] See Andersson et al. (2017) for a similar use of this instrument in a panel setting.
[13] The nodal destinations are Stockholm, Gothenburg, Malmö, Östersund and Korsvinger. In most specifications, I control for the distance to these nodal destinations. Additionally, I report robustness checks dropping nodal destinations completely in Table 1.15 in Appendix B.

three counterfactual railway networks.[14]

Identifying Assumptions

For the two-stage least squares framework described by equations 1.2 and 1.3 to produce causal estimates of ϕ, the instruments $\sum_d \delta_d \, \mathrm{PlanDist}_i \times \mathbb{1}\{\text{decade} = d\}_t$ need to satisfy a number of validity conditions. First, the instruments need to be relevant. That is, $\mathrm{PlanDist}_i$ needs to predict $\mathrm{RailDist}_{it}$, and this effect needs to vary between decades for the time-varying instrument to have bite. In Figure 1.5, I report the relationship between actual and planned distance to railway in select years. As expected, the effect is strongly positive in each year, but diminishing over time. A diminishing effect is intuitive: as the network expands, more marginal locations are connected, which weakens the predictive power of the early plans.

Second, the instrument needs to be uncorrelated with the error term in equation 1.2 (ϵ_{it}) to satisfy the exclusion restriction. In other words, proximity to the railway plans should predict social movement outcomes only via the channel of actual railway access. This condition intuitively seems to be satisfied in this case, given that the proposals were drawn strategically to connect major cities. Proximity to planned railways which were never built should therefore be uncorrelated with social and political outcomes decades later.[15]

Third, potential outcomes and potential treatments need to be conditionally independent of the instrument. The history of Swedish railway construction is once again helpful here, since municipalities were not targeted for their potential for flourishing social engagement. In most specifications, however, I control richly for geographical and demographic characteristics to guarantee (at a minimum) condi-

[14] Berger and Enflo (2017) show that the three individual instruments behave similarly.

[15] I test for this by regressing social movement outcomes prior to railway construction on the distance to the railway plan. Concretely, I run OLS regressions of the form $\mathrm{Y}_i = \delta \, \mathrm{PlanDist}_i + \beta \, \mathrm{X}_i + \eta_i$, using the first year of the sample only (1881), and only for subsamples of municipalities which were far from already constructed railways. Results are reported in Table 1.10 in Appendix B, and support the exclusion restriction of the instrument.

tional independence.[16]

The final requirement for a valid instrument is monotonicity (or "no defiers"). This condition intuitively seems to be satisfied, since proximity to a planned railway line is unlikely to cause some municipalities to be further away from realised rail than would have been the case if they were distant from the planned line.

1.5 Main Results

Using the identifying frameworks described in Section 1.4 above, I present results demonstrating the causal impact of railway access on the proliferation and growth of social movements. Before formally estimating the event study and instrumental variables equations, I provide some illustrative correlational evidence. Figure 1.6 presents maps showing the spatial relationships between railway expansion and social movement presence and membership. At the beginning of the sample period, in 1881, both rail and social movements were relatively sparsely distributed. Nevertheless, the spatial patterns can be seen clearly: connectedness with the railway network is associated with a higher density of social movements. After a decade of railway expansion, in 1890, the relationship becomes even more striking. Social movements spread along the completed railway network, suggesting a key role for rail in the diffusion of these movements.

Additionally, I present correlational evidence separately by movement type in Figure 1.7. Starting with Figure 1.7a, distance to the railway network is negatively correlated with the probability of movement presence, and consistently so across all movement types. Figure 1.7b demonstrates a similar negative relationship between distance to rail and membership. In this sense, railway access is crucial on both the extensive and intensive margins of social movement proliferation. Finally, in Figure 1.7c I report correlations between access and the number of distinct organisations

[16] Andersson et al. (2017) show that municipalities with different proximities to planned railway lines are well-balanced on pre-railway characteristics.

active in a municipality. The negative relationship presented in this figure suggests that, in addition to larger total membership, proximity to rail also increases the local variety of active groups. These results together suggest that mobility is key to the mobilisation of social movements. In the following sections, I investigate this relationship more formally.

1.5.1 Event Study Results

I begin by presenting results for the event study framework outlined in equation 1.1. As discussed above, I define the "event" to be the arrival of the railway within the proximity of a municipality. Any distance used in the definition of proximity will be arbitrary, but in the main results I use ten kilometres as the cut-off. I present robustness checks using different cut-offs in Figure 1.15 in Appendix B.

In Figures 1.8, 1.9 and 1.10, I report results for three different outcomes. First, in Figure 1.8, I show the impact of gaining access to the railway network on the extensive margin of social movement spread. The dependent variable in this regression is an indicator equal to 1 if any social movement is present in the municipality. The sequence of coefficients I report, $\rho_{t+\tau}$, captures the effect of access before and after the event. Reassuringly, there is no impact prior to the arrival of rail, suggesting that municipalities which would eventually end up with railway access were not on a differential pre-trend. In the years after gaining access, however, there is a small but positive and statistically significant effect on movement presence. As a concrete example, the coefficient $\rho_{t+3} = 0.029$ implies that three years after the arrival of rail, a municipality is around three percentage points more likely to host a social movement.

To speak to the effect of rail on the intensive margin of social movement proliferation, I report similar event study regressions in Figures 1.9 and 1.10. In these specifications, I take as outcomes the number of members and the number of distinct organisations, respectively. I transform both outcomes using a hyperbolic sine transformation, and control for population in both regressions to abstract away from any mechanical impact of population growth on these outcomes. Both sets of results support the descriptive evidence presented above: rail plays a significant role also on the intensive margins of diffusion. To interpret the results, again take the coefficient ρ_{t+3}. The estimated coefficients suggest that gaining railway access increases membership by almost 16 percent ($\rho_{t+3} = 0.157$) and the number of organisations by almost 5 percent ($\rho_{t+3} = 0.043$) after three years.

1.5.2 Instrumental Variables Results

The event study framework above is illustrative, but has the drawback of requiring a stark cut-off for the distance to the railway network. To identify the effect of distance without presupposing the relevant distance, estimating an equation like equation 1.2, in which social movement outcomes are regressed on distance to rail directly, is more appropriate. As discussed, however, estimating this equation by OLS is unlikely to yield causal estimates of ϕ. I therefore use an instrumental variables framework and estimate equations 1.2 and 1.3 using two-stage least squares.

I display the first-stage relationship graphically in Figure 1.5, and report results from a more formal estimation of the first-stage equation 1.3 in Table 1.2. In column 1, I report a parsimonious specification which includes only municipality and year fixed effects in addition to the instruments $\sum_d \delta_d \mathrm{PlanDist}_i \times \mathbb{1}\{\mathrm{decade} = d\}_t$.[17] The decade 1881-1890 is the baseline decade. As expected, the coefficients for the ensuing decades are negative and highly statistically significant. The negative effects should be interpreted as the change in the elasticity between the distances to realised and planned railways over time.

[17] Throughout, I use the inverse hyperbolic sine transformation of both actual and planned distances. Robustness checks using the natural logarithm are presented in Table 1.12 in Appendix B. I report standard errors clustered on the municipality level. For robustness checks using different standard error structures, see Table 1.13 in Appendix B. All regressions make use of census data, either to construct per capita measures of social movement activity or to control for census measures directly. In my main results, I assume a constant year-on-year growth rate of these measures, but I demonstrate in Table 1.14 in Appendix B that my results are robust to alternative interpolation regimes.

In columns 2, 3 and 4, I gradually introduce different controls to the specification to probe the stability of estimated coefficients. First I include time-invariant geographical controls interacted with year fixed effects. These controls capture determinants of the original railway plan proposals, and are therefore key to ensuring the (conditional) independence of the instruments.[18] In column 3, I introduce baseline demographic characteristics interacted with year fixed effects.[19] Finally, in column 4 I add a control for contemporaneous population.[20] The estimated coefficients remain relatively stable and highly significant throughout the successive inclusion of richer sets of controls.

Having established that the proposed instruments exhibit a strong first stage, I now discuss the main OLS and instrumental variables results. Beginning with an exploration of the extensive margin of diffusion in Table 1.3, I take an indicator for the presence of any social movement as the outcome. This table, like the rest of the tables presented in this section, takes the following structure: in columns 1, 2 and 3, I report OLS results gradually adding richer sets of controls, and in columns 4, 5 and 6, I report the same specifications using a two-stage least squares instrumental variables (IV) framework. The OLS results in columns 1, 2 and 3 suggest the expected negative relationship between distance to railway and social movement presence. Though coefficients are imprecisely estimated, the coefficients are negative throughout all specifications.

For reasons discussed above, however, these estimates are likely biased towards zero, so I now turn to the IV results reported in columns 4, 5 and 6.[21] The

[18] In particular, I include distance to the nodal destinations targeted by the military plans used in the construction of my instrument. As an additional robustness check, I report results completely dropping these nodal destinations in Table 1.15 in Appendix B.

[19] These are baseline characteristics in the sense that they are constructed using the 1880 census, the year prior to the start of my sample period.

[20] Throughout, I will use the inverse hyperbolic sine transformation of population.

[21] Corresponding reduced-form regressions are reported in Panel A of Table 1.11 in Appendix B. In Panels B-D of Table 1.11, I report similar regressions for other social movement outcomes (discussed below). The coefficients should be interpreted analogously to those of the first-stage results discussed above. Unconditionally across all years, social movement outcomes depend negatively on distance to the military plans. The positive coefficients on the interaction of the distance to the military plans with decade fixed effects therefore capture the attenuation of this negative

consistent negative relationship remains, and is significantly different from zero. Taking the richest specification in column 6, the estimated coefficient implies that doubling the distance to railway reduces the probability of social movement presence by 20 percentage points. This is a sizeable effect compared to the unconditional outcome mean of 0.49, suggesting that proximity to rail is instrumental for the extensive margin of diffusion.

In Tables 1.4 and 1.5, I present evidence for the impact of rail on the intensive margins of proliferation. First, in Table 1.4 I explore the effect on growth of membership per capita. Consistently across the OLS and IV results, I find that distance to the railway network negatively impacts growth. The IV estimate in column 6 suggests that doubling the distance to rail reduces the growth of membership by five members per 1000 inhabitants per year.

Additionally, in Table 1.5 I report estimates of the impact on the growth of the number of organisations per 1,000 inhabitants. This measure captures the level of diversity of representation offered by social movements. A greater number of population-weighted organisations indicates a weakly better match between individual and organisation preferences. Consistent with previous results, the estimates reported in Table 1.5 suggest that proximity to rail fostered a larger variety of local organisations. Increasing the distance to the nearest railway line is associated with a reduction in the rate of growth of local richness of representation.

A greater number of local organisations is indicative of an increased ability of individuals to find a movement that matches their preferences. If one group captures the majority of the "market share" of membership, however, then a larger number of organisations masks a *de facto* concentration of membership. To tease out the effect on variety of representation *per se*, I construct an index of within-movement membership concentration. Formally, I define the within concentration of municipality i in year t as:

relationship over time (recall that the omitted decade is 1881-1890).

$$\text{WithinConcentration}_{it} = \max_{k,m}\{\text{Share}_{kmit}\}$$

Where k denotes an organisation, and m denotes a movement type. Each Share_{kmit} is calculated as:

$$\text{Share}_{kmit} = \frac{\text{Membership}_{kmit}}{\text{Membership}_{mit}}$$

Therefore, Share_{kmit} is organisation k's share of the total membership in its movement type m. The within concentration in municipality i is then the maximum such share across all movement types. Naturally, this index is defined only for municipalities where at least one movement type is present. A larger value of the index indicates greater concentration of membership. It is similar in flavour to the Herfindahl index, with the attractive feature that it can straightforwardly be applied to a panel setting where the number of movement types and organisations are allowed to vary within a municipality over time.

I report estimates of the effect of rail on within-movement concentration in Table 1.6. The results suggest that, in addition to fostering a greater number of organisations, railway proximity also reduces the level of concentration. That is, not only do individuals in municipalities with better railway access have a wider selection of potential associations on offer, they also choose more broadly from this selection. As a concrete example, column 6 suggests that doubling the distance to rail increases the concentration of membership in the largest movement by 9 percentage points.

Comparing OLS and IV results

Throughout the reported results, a striking feature is that the IV results are consistently larger than those from the OLS. This is to be expected for two main reasons. First, as discussed above, since distances to rail are calculated based on a railway network digitised from historical maps, some degree of measurement error is to be expected. Since this error is likely to be classical in nature, OLS estimates are biased towards zero. Instrumental variables estimates solves the measurement error bias, and therefore naturally leads to larger coefficient estimates.

Second, the instrumental variables framework estimates an effect similar to the local average treatment effect of the "compliers".[22] That is, the estimated effect of rail on social movement outcomes obtained from the IV comes from those municipalities which were proximate to the constructed railway network only by virtue of being close to the planned routes, but would not have been close to rail otherwise. It is probable that the treatment effect for municipalities which were connected "by accident" is greater than for municipalities which would have received network access regardless of proximity to planned routes. In a sense, it is also the effect of such accidental connectivity which is most interesting to study if we are interested in causal estimates, since it is the most plausibly exogenous source of variation in railway access.

1.5.3 Discussion

Across a range of correlational and causal evidence, I have demonstrated the crucial role played by transportation infrastructure in enabling the diffusion of social movements along both intensive and extensive margins. Not only is railway access causally predictive of the entry of social movements into a municipality, it also drives the growth of membership in these movements. In addition, railway proximity fosters diversity of local representation, as measured both by the population-weighted number of organisations and by the concentration of membership within different movement types. In the following section, I probe the mechanisms underlying these results. In particular, building on the market access literature, I claim

[22] The strict interpretation of local average treatment effects applies to binary treatments and instruments. Here, the treatments and instruments are continuous, and as such the interpretation of the effect is slightly more complicated, though similar.

that by reducing effective distances between municipalities, the expansion of the railway network facilitated a social contagion of ideas.

1.6 Mechanisms: Social Movement "Market Access"

Having established that proximity to the railway network drives the diffusion of social movements, I now elucidate the mechanisms which underlie this effect. The historiography of the Swedish railway alluded to in Section 1.2 above suggests two key forces. Newly established railway connections reduce effective distances between municipalities, which on the one hand enables the organic spread of social movements from one municipality to the next, creating a social contagion effect. On the other hand, reductions in effective travel costs also facilitates the directed efforts of individual actors within movements to target particular municipalities, which creates a more strategic pattern of diffusion.

I employ a conceptual framework akin to the "market access" measure of Donaldson and Hornbeck (2016) to quantify and disentangle these related but distinct effects. A general market access measure for municipality i in year t is defined as the least-cost path weighted average of some outcome M_{jt} in other municipalities j:

$$\mathrm{MarketAccess}_{it} = \sum_{j \neq i} \mathrm{Cost}_{ijt}^{-\theta} \times \mathrm{M}_{jt}$$

Here, Cost_{ijt} is a resistance term, capturing the cost associated with the least costly path between municipalities i and j in year t. Further details on the calculations of these costs are provided in Appendix A. The parameter θ is set to 1 by convention. Different interpretations of market access are possible, depending on the variable chosen for M_{jt}, allowing me to explore the different mechanisms driving the main effects.

1.6.1 Spatial Contagion of Social Movements

A possible interpretation of market access is to set $\mathrm{M}_{jt} = \mathrm{Membership}_{jt}$. That is, $\mathrm{MarketAccess}_{it}$ is a least-cost path weighted average of movement memberships in all other municipalities. In this interpretation, the resistance terms $\mathrm{Cost}_{ijt}^{-\theta}$ can be collected in a complete adjacency matrix summarising the network of municipalities, where the weight of each edge is the inverse of the least cost term:

$$\mathrm{MarketAccess}_t = \begin{bmatrix} \mathrm{Cost}_{11}^{-\theta} & \mathrm{Cost}_{12}^{-\theta} & \dots & \mathrm{Cost}_{1n}^{-\theta} \\ \mathrm{Cost}_{21}^{-\theta} & \mathrm{Cost}_{22}^{-\theta} & \dots & \mathrm{Cost}_{2n}^{-\theta} \\ \vdots & \vdots & \ddots & \vdots \\ \mathrm{Cost}_{n1}^{-\theta} & \mathrm{Cost}_{n2}^{-\theta} & \dots & \mathrm{Cost}_{nn}^{-\theta} \end{bmatrix}_t \begin{bmatrix} \mathrm{Membership}_1 \\ \mathrm{Membership}_2 \\ \vdots \\ \mathrm{Membership}_n \end{bmatrix}_t$$

This measure of market access relates very closely to the peer effects literature, and is therefore ideal for capturing the spatial contagion of membership. Essentially, every municipality is a "peer" of every other municipality, where the strength of the connection is determined by the transportation infrastructure linking them. The term $\mathrm{Cost}_{ijt}^{-\theta} \times \mathrm{Membership}_{jt}$ captures the access to and influence from the movement membership in municipality j on municipality i in year t. As the effective cost falls or the membership in j grows, a greater peer effect is exerted on i by j, thereby increasing the probability of contagion. I provide details on the construction of the least-cost matrix used to calculate the cost terms Cost_{ijt} in Appendix A.

1.6.2 Market Potential and Strategic Spread

In addition to the peer effects interpretation of market access, a more traditional reading from the economic geography literature is possible. If $\mathrm{M}_{jt} = \mathrm{Population}_{jt}$, then the market access measure becomes $\sum_{j \neq i} \mathrm{Cost}_{ijt}^{-\theta} \times \mathrm{Population}_{jt}$, a distance-weighted average of population which captures a municipality's market potential.

With this measure, I can approximate the optimisation problem solved by operatives of the social movements when strategically deciding where to spread their ideas.

Given two observationally equivalent municipalities, operatives will want to target the municipality where the potential audience in neighbouring settlements is greater. This is similar in flavour to the type of strategic behaviour conceptualised by Hanson and Xiang (2013) to explain the globalisation of Christianity. Under this interpretation, municipalities with a greater market potential should exhibit greater movement presence and membership.

1.6.3 Disentangling Contagion and Market Potential Effects

Disentangling these related effects is an empirical task. To this end, I operationalise the market access measure within my instrumental variables framework. The relevant second stage becomes:

$$\mathrm{Y}_{it} = \alpha_i + \gamma_t + \kappa \,\mathrm{MarketAccess}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it} \tag{1.4}$$

Where $\mathrm{MarketAccess}_{it}$ can take one of the two interpretations described above. Under both interpretations, I expect $\kappa > 0$. Since market access is endogenous to social movement outcomes, I instrument for it in the first stage given by:

$$\mathrm{MarketAccess}_{it} = \alpha_i + \gamma_t + \sum_d \delta_d \,\mathrm{PlanDist}_i \times \mathbb{1}\{\mathrm{decade} = d\}_t + \mathrm{X}'_{it}\,\beta + \nu_{it} \tag{1.5}$$

Crucially, the roll-out of the railway network provides me with within-dyad variation in the $\mathrm{MarketAccess}_{it}$ measure over time. As the network expands, connectivity between municipalities improves. To illustrate, Figure 1.11 shows how least-costs to Stockholm decreased over the sample period. Similar maps can be drawn for the least-costs to each of the 2,270 municipalities in my sample. In Figure

1.12, I document that these improvements in connectedness asymmetrically affected initially worse-connected municipalities. While costs fell by over 20 percent from 1881 to 1910 in the top quartile of municipalities, they fell by close to 40 percent in the bottom quartile over the same period. This asymmetry speaks to the two potential channels of transmission for social movements noted by McAdam (2003): diffusion (spread along existing network ties) and brokerage (spread along newly created network ties). The wider geographical reach of the railway network and asymmetric fall in travel costs seems to favour the "brokerage" interpretation.

In Table 1.7, I summarise the impact of different market access measures on my four key social movement outcomes.[23] Columns 1 and 2 provide OLS and IV estimates, respectively, using the peer effects measure of market access in the full specifications including the richest set of controls. In columns 3 and 4, I report the same using the market potential measure. To disentangle the two effects, I use membership per capita in my market access measure in columns 5 and 6. If the membership effect in columns 1 and 2 is driven by the population effect in columns 3 and 4, then the membership per capita effect should be zero. This provides me with an indirect way of testing for social contagion as a key mechanism.

The various specifications in columns 1 and 2 suggest a contagion effect. Higher access to membership in neighbouring municipalities increases the likelihood of movements spreading, spurs the growth of per capita membership and the variety of associations, and reduces the concentration of membership within a single organisation. However, this may be mechanically related to the market potential effect, which I document in columns 3 and 4. Proximity to higher-population municipalities also significantly drives the same measures of social movement proliferation.

To net out the population effect from the contagion effect, I report estimates using a per capita membership market access measure in columns 5 and 6. I still find a highly consistent and significant effect across all the social movement outcomes,

[23] All market access measures have been transformed using an inverse hyperbolic sine transformation.

suggesting that the social contagion effect is not merely an artefact of population size. These results point to the importance of access to existing hubs of social movement activity for the continued diffusion of the movement.

1.6.4 Station-Level Results

To support the claim that social contagion drives the growth of social movements, I use station-level data to demonstrate that an increase in the number of passenger arrivals in a municipality is associated with heightened social movement presence and growth. Crucially, the same relationship does not hold for freight arrivals, which dispels concerns that the diffusion effect I document is simply an artefact of increased local economic activity. Rather, the effect of passenger arrivals on social movement spread is indicative of the key role of the mobility of individuals in spreading socially salient ideas.

As detailed in Section 1.3 above, I use data on the number of passengers and the volume of freight arriving at each station in each year, and match the station data to the municipalities in my main sample. I create a balanced panel of the subset of municipalities which at some point in the thirty-year period 1881-1910 had a local railway station. I then estimate OLS regressions of the form:

$$\mathrm{Y}_{it} = \alpha_i + \gamma_t + \lambda \, \mathrm{Arrivals}_{it} + \mathrm{X}'_{it} \, \beta + \epsilon_{it} \tag{1.6}$$

The variable $\mathrm{Arrivals}_{it}$ is either the number of passengers or the volume of freight arriving into municipality i in year t.[24] Since my municipality-year panel is balanced, a municipality will by definition have zero passenger and freight arrivals prior to the construction of a station. To abstract away from the effect of the construction of a station *per se*, I control for the presence of a station in all regressions. The coefficient of interest, λ, therefore captures the effect of an increase in passenger or freight arrivals on the social movement outcome of interest, Y_{it}. If the movement

[24] I use the inverse hyperbolic sine transformation of both types of arrivals throughout.

of individuals is key to the spread of social movements, then we expect $\lambda > 0$ for passenger arrivals but $\lambda = 0$ for freight arrivals.

I report results of this exercise in Table 1.8. Each set of three columns takes as the dependent variable one of the key social movement outcomes already discussed. In columns 1-3, for example, I explore the effect of passenger and freight arrivals on the presence of any social movement organisation in the municipality. The estimated coefficient reported in column 1 suggests that a doubling of the number of passenger arrivals in a municipality is associated with a 5 percentage point increase in the probability that a social movement organisation is present there. Interestingly, there is no analogous effect of freight arrivals, as shown in column 2. When both passenger and freight arrivals are included in column 3, the effect of passenger arrivals clearly dominates.

The remainder of the table repeats the exercise for the three other social movement outcomes, and a very similar pattern emerges. Movement membership and organisational density both depend positively on passenger arrivals, but not on freight arrivals (columns 4-9). While statistically indistinguishable from zero, the signs of the coefficients in columns 10-12 suggest that the concentration of movement membership within a single organisation is reduced with increases in passenger arrivals, but not with increases in freight arrivals.

Taken as a whole, these results underscore the crucial role of the mobility of individuals in the spread and growth of popular movements.[25] Viewed together with the market access results above, a salient mechanism explaining the impact of railway access on social movement proliferation is revealed. By reducing least-cost

[25] A potential alternative mechanism consistent with these results is a changing local occupational structure. Suppose, for example, that industry develops in a municipality due to railway access. This would result both in greater inflow of migrants and, potentially, of increased social movement activity as industrial workers organise in unions. To investigate this mechanism, I re-run my baseline specification with occupational shares in major economic sectors as the outcome. These results are reported in Table 1.16 in Appendix B. There is no systematic contemporaneous effect of improved railway access on industrialisation. This is not to suggest that railway access does not matter for industrialisation, but rather that the process of industrialisation is likely slower-moving than the diffusion of social movements documented in this chapter and hence cannot be a main driver of my results.

distances between places, the railway network facilitated the spread of ideas from one municipality to the next by enabling individuals to travel.

1.7 Strategic Interactions between Movements

Reductions in effective distances as a result of railway expansion profoundly shaped the diffusion of social movements in the period 1881-1910. In Section 1.5, I demonstrated this effect using a variety of empirical strategies, and in Section 1.6 I highlighted social contagion as a key mechanism driving this result. In this section, I explore the manner in which railway roll-out shaped the strategic interactions between different movement types.

It is theoretically ambiguous whether memberships in different movements should act as substitutes or complements to one another. If the individual optimisation problem is such that membership in one organisation satiates demand for membership in additional organisations, then the presence of one movement in a given municipality would preclude the entry of further movements. On the other hand, if second-mover entry is subject to lower fixed costs than first-mover entry (due to social capital that has already been established as a result of the first entry, for example), then movements can crowd in further movements.[26]

In addition to such theoretical ambiguity, the strategic interrelationships may be context-specific. In the particular context of Swedish social movements, the religious underpinnings of some temperance organisations manifested as a symbiotic relationship between free church organisations and the wider temperance movement. Such cooperation was less likely with more labour-oriented social movements (even though many political goals, such as a widening of the franchise, were shared).

To investigate these relationships, I take the temperance movement as a case study and estimate equations of the following form:

[26]Stepan-Norris and Southworth (2010), for example, find that competition between rival unions increased overall union density in the United States.

$$\text{Presence}_{it}^{\text{Temp}} = \alpha_i + \gamma_t + \pi^k \, \text{Presence}_{it}^{k} + \text{X}_{it}' \, \beta + \epsilon_{it} \tag{1.7}$$

Here, $\text{Presence}_{it}^{\text{Temp}}$ is an indicator for the presence of the temperance movement in municipality i in year t and Presence_{it}^{k} is the presence of another movement, with $k \in \{\text{Free church}, \text{Union}, \text{Left party}\}$. The set of coefficients π^k therefore captures the strategic complementarity or substitutability between the temperance movement and the other movement types.

I report results from this exercise in Panel A of Table 1.9. Each column corresponds to a different movement type k, and presents estimates of π^k in equation 1.7. Strikingly, there is strong complementarity between the temperance and free church movements, whereas the presence of labour movements negatively predicts temperance movement entry.

1.7.1 The Effect of Railway Access on Movement Interrelationships

Having established the unconditional relationships between the different movement types, I now investigate the role of railway access in shaping these interrelationships. By decreasing effective travel costs, the expansion of the railway network may also shape the strategic interactions between the different groups. For example, with greater ease of travel, it may become more difficult for labour organisations to prevent the entry of temperance representatives into the community.

In Figure 1.13, I present descriptive evidence that access to rail reduces the degree of substitution between temperance and labour organisations, while it does not alter the complementarity between temperance movements and the free church. The positive relationship between temperance and free church presence is virtually identical in municipalities proximate to and distant from the railway, as shown in Figures 1.13a and 1.13b. For labour organisations, however, the substitution effect present in the full sample seems to be driven primarily by municipalities far from the railway network. In municipalities near rail, the negative relationship is dampened or disappears completely.

I demonstrate this effect more formally in a regression framework in Panels B and C of Table 1.9. In Panel B I repeat the regression exercises from above only for the subsample of municipalities that are on average of above-median proximity to rail during my sample period.[27] Similarly, in Panel C I do the same for municipalities of below-median proximity.

This exercise shows that the complementarities between temperance organisations and free churches hold regardless of railway connectivity. The substitutabilities between labour and temperance organisations, however, are driven entirely by the low-proximity subsample. This suggests that, in addition to driving a general diffusion of social movements throughout the period 1881-1910, railway expansion also fundamentally shaped the interactions between different social groupings. To the extent that democratisation in Sweden depended on elites being pressured concurrently by both religious groups and labour organisations, railway expansion and heightened mobility of individuals may have crucially underpinned such cooperation.

1.8 Concluding Remarks

In this chapter, I document the impact of improvements in transportation technologies on the diffusion of engagement in social movements. In particular, I exploit a formative episode from Swedish history to estimate the causal effect of proximity to the newly rolled-out railway network on the spread of key popular associations. Rail is instrumental for both extensive and intensive margins of growth: municipalities near the network are more likely to host a movement of any type, and exhibit greater growth rates of membership in these movements. In addition, a greater number of distinct organisations operate in these municipalities and membership

[27] Concretely, I compute for each municipality the average distance to rail over the thirty-year period 1881-1910 and perform a median split using this average proximity.

is less concentrated within one particular organisation. Increased connectedness is therefore predictive not only of extensive- and intensive-margin proliferation, but also of better-aligned matches between individual and group preferences.

I provide evidence that these effects are driven by a diffusion process characterised by social contagion. Using a "market access" framework, I show that railway expansion effectively reduced least-cost distances between municipalities. For a given municipality, these reductions intensified the influence exerted by movement memberships in neighbouring municipalities. In addition, I shed light on the strategic interactions between movements, and show that improvements in communication technologies fundamentally shaped these interrelationships by lowering the degree of substitutability between different movement types.

This chapter speaks to the two long-standing literatures on social movements and transportation infrastructure, and adds to the small but growing recent intersection between these two bodies of work. In so doing, I elucidate the crucial role played by interaction costs in shaping social phenomena. By combining a unique historical episode with a well-identified econometric framework, I shed light on the role of social contagion in the diffusion of ideas. I thereby contribute to our understanding of popular engagement in social movements, and how technology aids and shapes such engagement.

1.9 Tables

Table 1.1: Summary statistics

	Obs.	Mean	St. Dev.	Min.	Max.
Panel A. Social movement summary statistics					
Any movement present	68100	0.49	0.50	0	1
Temperance movement present	68100	0.37	0.48	0	1
Free church present	68100	0.33	0.47	0	1
Union present	68100	0.06	0.23	0	1
Left party present	68100	0.03	0.16	0	1
Total membership	68100	138.77	994.14	0	83570
Temperance movement membership	68100	56.59	207.83	0	9483
Free church membership	68100	50.18	250.39	0	12287
Union membership	68100	18.93	371.73	0	36018
Left party membership	68100	13.07	308.01	0	30327
Panel B. Social movement summary statistics conditional on movement presence					
Total membership	33532	281.82	1402.45	1	83570
Temperance movement membership	24888	154.85	320.90	1	9483
Free church membership	22551	151.52	417.10	1	12287
Union membership	3980	323.84	1505.40	1	36018
Left party membership	1808	492.34	1827.34	3	30327
Total number of organisations	33532	3.67	7.09	1	247
Number of temperance organisations	24888	2.55	3.78	1	115
Number of free churches	22551	1.77	1.36	1	28
Number of unions	3980	4.52	8.71	1	135
Number of left parties	1808	1.09	0.31	1	3

Note: Summary statistics for key variables. **Panel A** contains summary statistics for social movement outcomes for the complete municipality-year panel (2,270 municipalities, 30 years). The variable “Any movement present” is an indicator equal to one if any social movement is present in the municipality-year. The following four variables are indicators for the presence of particular social movements: temperance movements, free churches, unions and left parties. “Total membership” is the combined membership across all movement types, and the following four variables decompose this total into membership in the four different movements. **Panel B** contains summary statistics for the subset of municipality-years where at least one social movement is present. The first five variables capture the total membership as well as membership in individual movement types, conditional on movement presence. The second set of five variables captures the total number of organisations overall as well as within each movement type, conditional on movement presence.

Table 1.1: Summary statistics (continued)

	Obs.	Mean	St. Dev.	Min.	Max.
Panel C. Railway summary statistics					
Distance to rail (km)	68100	11.80	31.25	0	677
Rail within 5 km	68100	0.48	0.50	0	1
Rail within 10 km	68100	0.71	0.45	0	1
Rail within 20 km	68100	0.88	0.33	0	1
Distance to railway plan	2270	33.92	59.61	0	519
Arriving passengers (thousands)	5190	33.22	100.10	0	2260
Arriving freight (thousands of tons)	5190	15.05	66.47	0	1381
Panel D. Census summary statistics					
Total population	68100	2181.13	5855.63	90	282150
Adult population	68100	1237.82	3781.63	57	188932
Share ISCO 1	68100	0.01	0.01	0	0.15
Share ISCO 2	68100	0.02	0.01	0	0.45
Share ISCO 3	68100	0.01	0.02	0	0.33
Share ISCO 4	68100	0.01	0.01	0	0.14
Share ISCO 5	68100	0.14	0.05	0	0.43
Share ISCO 6	68100	0.51	0.15	0	0.97
Share ISCO 7	68100	0.10	0.07	0	0.64
Share ISCO 8	68100	0.04	0.05	0	0.74
Share ISCO 9	68100	0.08	0.08	0	0.81
Share ISCO 10	68100	0.03	0.03	0	0.80

Note: Summary statistics for key variables. **Panel C** contains railway summary statistics. "Distance to rail" is a measure of geodesic distance (in km) from the seat of the municipality to the nearest completed railway line. The following three variables are indicators for whether a municipality is within 5, 10, or 20 km of a railway line in a given year. Finally, the variable "Distance to railway plan" is the time-invariant distance from a municipality to the military railway plans described in the text. "Arriving passengers" and "Arriving freight" are station-level variables measuring (in thousands) the number of arriving passengers and tons of freight in each station-year. **Panel D**, lastly, provides municipality-year summary statistics from census data. The variables "Total population" and "Adult population" are the total number of inhabitants and adult inhabitants residing in the municipality at the time of each census. The "Share ISCO" variables summarise the proportion of employed individuals working in major ISCO groups. Censuses were conducted in 1880, 1890, 1900 and 1910. Values outside of these years are interpolated assuming constant rates of change between census years.

Table 1.2: First stage

	Dependent variable: distance to railway			
	(1)	(2)	(3)	(4)
Distance to railway plans × 1890	-0.143***	-0.123***	-0.117***	-0.119***
	(0.011)	(0.012)	(0.012)	(0.012)
Distance to railway plans × 1900	-0.186***	-0.172***	-0.154***	-0.156***
	(0.013)	(0.018)	(0.019)	(0.018)
Observations	68100	68100	68100	68100
Municipalities	2270	2270	2270	2270
Clusters	2270	2270	2270	2270
Outcome mean	2.323	2.323	2.323	2.323
Mun. FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Geogr. chars. × Year FE		Y	Y	Y
Baseline chars. × Year FE			Y	Y
Population controls				Y

Note: First stage regressions of the form: $\text{RailDist}_{it} = \alpha_i + \gamma_t + \sum_d \delta_d \, \text{PlanDist}_i \times \mathbb{1}\{\text{decade} = d\}_t + \text{X}'_{it}\,\beta + \nu_{it}$. The dependent variable is the inverse hyperbolic sine transformation of the distance to the nearest constructed railway line. 1880 is the omitted decade. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.3: Railway access and the presence of social movements

	Dependent variable: presence of any social movement					
	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance to railway	-0.011*	-0.009	-0.008	-0.150**	-0.159**	-0.199***
	(0.006)	(0.006)	(0.006)	(0.065)	(0.063)	(0.073)
Observations	68100	68100	68100	68100	68100	68100
Municipalities	2270	2270	2270	2270	2270	2270
Clusters	2270	2270	2270	2270	2270	2270
Outcome mean	0.492	0.492	0.492	0.492	0.492	0.492
K-P F-stat				56.62	60.35	53.78
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Population controls		Y	Y		Y	Y
Baseline chars. × Year FE			Y			Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi\, \mathrm{RailDist}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it}$. The dependent variable is an indicator equal to 1 if any movement organisation is present in the municipality. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.4: Railway access and the growth of membership in social movements

	Dependent variable: growth of membership per 1000 inhabitants					
	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance to railway	-0.717***	-0.730***	-0.540***	-6.420***	-6.083***	-6.398***
	(0.172)	(0.172)	(0.168)	(1.951)	(1.864)	(2.070)
Observations	65830	65830	65830	65830	65830	65830
Municipalities	2270	2270	2270	2270	2270	2270
Clusters	2270	2270	2270	2270	2270	2270
Outcome mean	2.679	2.679	2.679	2.679	2.679	2.679
K-P F-stat				53.38	56.78	51.28
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Population controls		Y	Y		Y	Y
Baseline chars. × Year FE			Y			Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi\,\mathrm{RailDist}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it}$. The dependent variable is the growth rate of membership per 1000 inhabitants: $\Delta \frac{\text{Total members}}{\text{Population/1000}}$. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.5: Railway access and the growth of organisations per capita

	Dependent variable: growth of organisations per 1000 inhabitants					
	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance to railway	-0.024***	-0.024***	-0.018***	-0.226***	-0.217***	-0.221***
	(0.005)	(0.005)	(0.005)	(0.044)	(0.043)	(0.048)
Observations	65830	65830	65830	65830	65830	65830
Municipalities	2270	2270	2270	2270	2270	2270
Clusters	2270	2270	2270	2270	2270	2270
Outcome mean	0.0964	0.0964	0.0964	0.0964	0.0964	0.0964
K-P F-stat				53.38	56.78	51.28
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Population controls		Y	Y		Y	Y
Baseline chars. × Year FE			Y			Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi\,\mathrm{RailDist}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it}$. The dependent variable is the growth rate of the number of organisations per 1000 inhabitants: $\Delta\frac{\text{Total number of organisations}}{\text{Population/1000}}$. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.6: Railway access and the concentration of membership in social movements

	Dependent variable: movement concentration					
	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance to railway	-0.001	-0.000	0.001	0.116***	0.100**	0.086**
	(0.003)	(0.003)	(0.004)	(0.043)	(0.040)	(0.038)
Observations	33453	33453	33453	33453	33453	33453
Municipalities	1850	1850	1850	1850	1850	1850
Clusters	1850	1850	1850	1850	1850	1850
Outcome mean	0.912	0.912	0.912	0.912	0.912	0.912
K-P F-stat				15.95	16.99	21.91
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Population controls		Y	Y		Y	Y
Baseline chars. × Year FE			Y			Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi\,\mathrm{RailDist}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it}$. The dependent variable is the share of movement membership captured by the largest organisation. See text for details. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.7: Market access and social movement outcomes

Market access measure:	Membership		Population		Membership p.c.	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Dependent variable: movement presence						
Market access	0.047***	0.521***	0.025	0.899***	0.073***	0.578***
	(0.015)	(0.177)	(0.016)	(0.336)	(0.016)	(0.198)
Outcome mean	0.492	0.492	0.492	0.492	0.492	0.492
K-P F-stat		37.23		15.79		30.22
Panel B. Dependent variable: growth of membership per 1000 inhabitants						
Market access	2.586***	11.414***	1.748***	21.252***	3.308***	12.434***
	(0.455)	(4.176)	(0.392)	(8.242)	(0.526)	(4.540)
Outcome mean	2.679	2.679	2.679	2.679	2.679	2.679
K-P F-stat		37.74		14.56		31.92
Panel C. Dependent variable: growth of organisations per 1000 inhabitants						
Market access	0.097***	0.479***	0.051***	0.882***	0.132***	0.521***
	(0.014)	(0.103)	(0.013)	(0.233)	(0.016)	(0.111)
Outcome mean	0.0964	0.0964	0.0964	0.0964	0.0964	0.0964
K-P F-stat		37.74		14.56		31.92
Panel D. Dependent variable: membership concentration						
Market access	-0.013	-0.208**	-0.007	-0.495**	-0.018**	-0.218**
	(0.009)	(0.084)	(0.009)	(0.244)	(0.009)	(0.089)
Outcome mean	0.912	0.912	0.912	0.912	0.912	0.912
K-P F-stat		22.87		5.600		20.10
Observations	68100	68100	68100	68100	68100	68100
Municipalities	2270	2270	2270	2270	2270	2270
Clusters	2270	2270	2270	2270	2270	2270
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Population controls	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y	Y	Y	Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \kappa\,\mathrm{MarketAccess}_{it} + \mathrm{X}'_{it}\,\beta + \epsilon_{it}$, where $\mathrm{MarketAccess}_{it} = \sum_{j \neq i} \mathrm{Cost}_{ijt}^{-\theta} \times \mathrm{M}_{jt}$. Different columns utilise different variables M_{jt} in the construction of the market access measure. See text for details. Dependent variables are defined as follows. Panel A: indicator equal to 1 if any movement organisation is present in the municipality. Panel B: growth rate of membership per capita: $\Delta \frac{\text{Total members}}{\text{Population}}$. Panel C: growth rate of the number of organisations per 1000 inhabitants: $\Delta \frac{\text{Total number of organisations}}{\text{Population/1000}}$. Panel D: share of movement membership captured by the largest organisation. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.8: Station-level results: the effect of passenger and freight arrivals on social movement outcomes

Dependent variable:	Presence of any movement			Movement membership			Organisations per 1000 inhab.			Movement concentration		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Passenger arrivals	0.052*		0.055**	0.379***		0.437***	0.247**		0.301**	-0.008		-0.012
	(0.027)		(0.028)	(0.133)		(0.137)	(0.108)		(0.123)	(0.012)		(0.015)
Freight arrivals		0.012	-0.004		0.047	-0.075		0.014	-0.070		0.003	0.006
		(0.015)	(0.016)		(0.072)	(0.073)		(0.063)	(0.070)		(0.007)	(0.009)
Observations	5190	5190	5190	5190	5190	5190	5190	5190	5190	3702	3702	3702
Municipalities	173	173	173	173	173	173	173	173	173	161	161	161
Clusters	173	173	173	173	173	173	173	173	173	161	161	161
Outcome mean	0.713	0.713	0.713	4.288	4.288	4.288	1.790	1.790	1.790	0.900	0.900	0.900
Mun. FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Population controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: OLS regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \lambda\, \mathrm{Arrivals}_{it} + \mathrm{X}'_{it}\, \beta + \epsilon_{it}$. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population. In all regressions, I control for the presence of a station in the municipality.

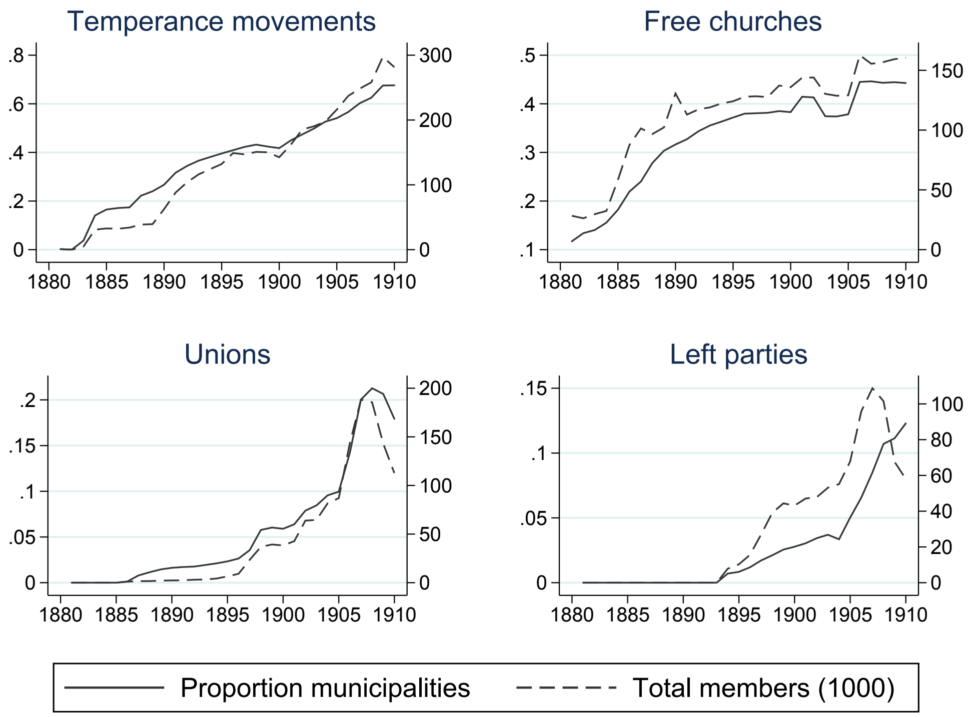
Table 1.9: Cross-relationships between different movement presences

	Dependent variable: presence of temperance movement		
Other movement:	Free church (1)	Union (2)	Left party (3)
Panel A. Cross-relationships between movements - all municipalities			
Presence of other movement	0.073^{***}	-0.030^{**}	-0.046^{**}
	(0.012)	(0.015)	(0.018)
Panel B. Cross-relationships between movements - municipalities near rail			
Presence of other movement	0.073^{***}	0.007	-0.022
	(0.016)	(0.019)	(0.023)
Panel C. Cross-relationships between movements - municipalities far from rail			
Presence of other movement	0.066^{***}	-0.070^{***}	-0.053^{*}
	(0.016)	(0.023)	(0.032)
Total observations	68100	68100	68100
Municipalities	2270	2270	2270
Clusters	2270	2270	2270
Outcome mean	0.365	0.365	0.365
Mun. FE	Y	Y	Y
Year FE	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y
Population controls	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y

Note: OLS regressions of the form: $\text{Presence}_{it}^{\text{Temp}} = \alpha_i + \gamma_t + \pi\ \text{Presence}_{it}^{k} + \text{X}_{it}'\ \beta + \epsilon_{it}$. The dependent variable is an indicator equal to 1 if a temperance organisation is present in the municipality. Panel A reports estimates for the full sample, whereas Panels B and C report estimates for municipalities near and far from rail, respectively. See text for details. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

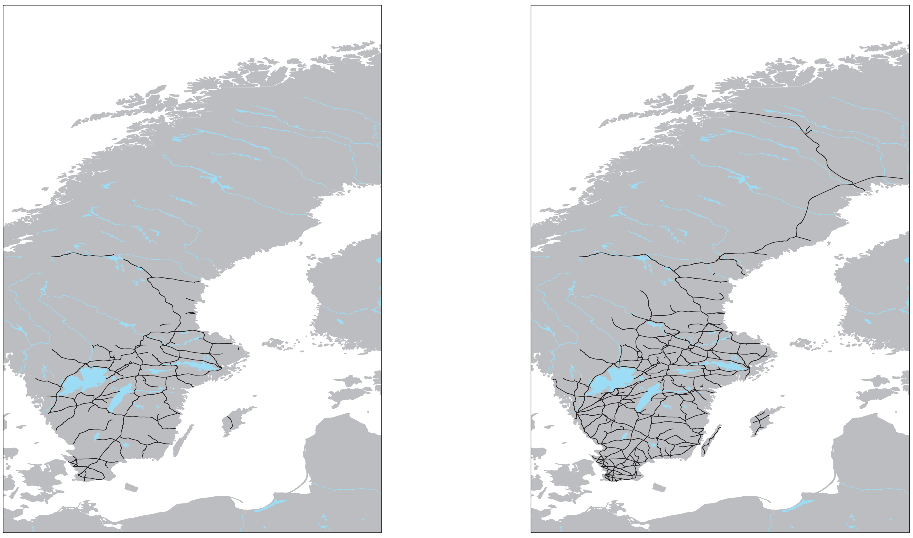
1.10 Figures

Figure 1.1: Social movements over time



Note: Summary graphs showing the presence of and membership in four different social movements over the sample period 1881-1910. Solid line (left axis) shows the proportion of municipalities with a given movement type present. Dashed line (right axis) shows the total national membership (in thousands) of a given movement type.

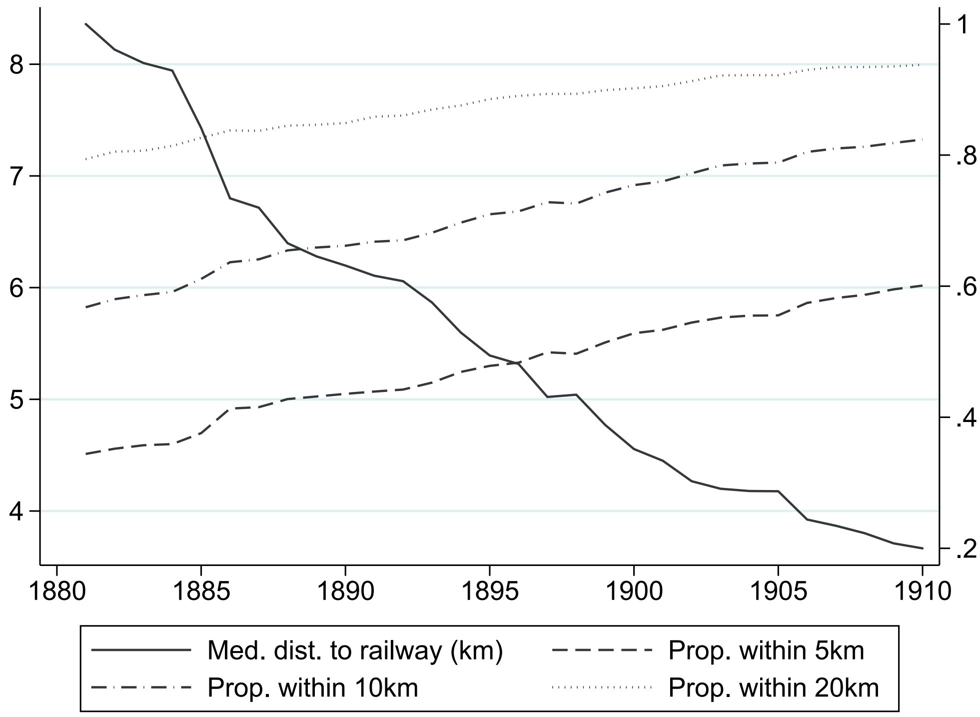
Figure 1.2: Railway network expansion, 1881-1910



(a) 1881 (b) 1910

Note: Maps showing the extent of the Swedish railway network at the start (1881) and end (1910) of the sample period. These years are chosen to show the full extent of railway expansion over this period. Main analysis exploits year-on-year expansions of the railway network.

Figure 1.3: Railway access over time



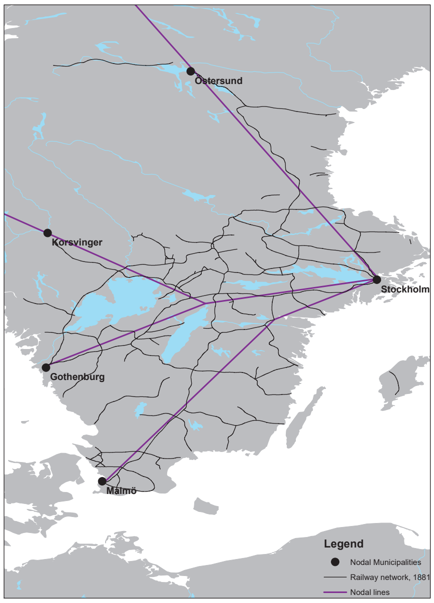
Note: Summary graphs showing railway access over the sample period 1881-1910. Solid line (left axis) shows the median distance (in km) to rail in each year. Dashed lines (right axis) respectively show the proportion of municipalities within 5, 10 and 10 km of rail in each year.

Figure 1.4: Military railway plan instruments and actual railways, 1881

(a) Actual

(b) Von Rosen plan

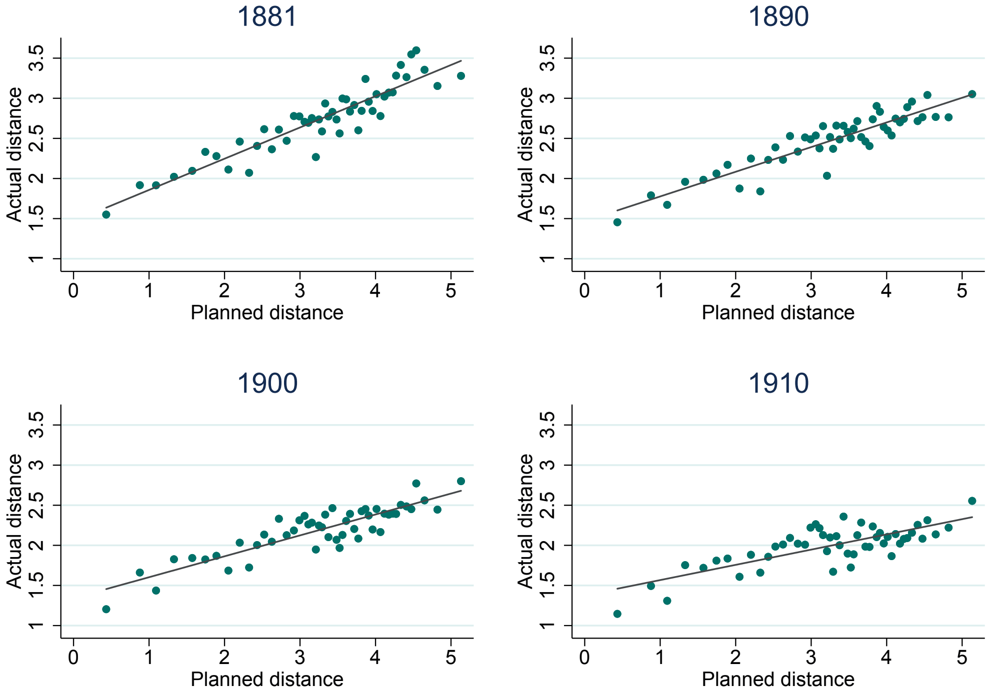
(c) Ericson plan



(d) Nodal lines

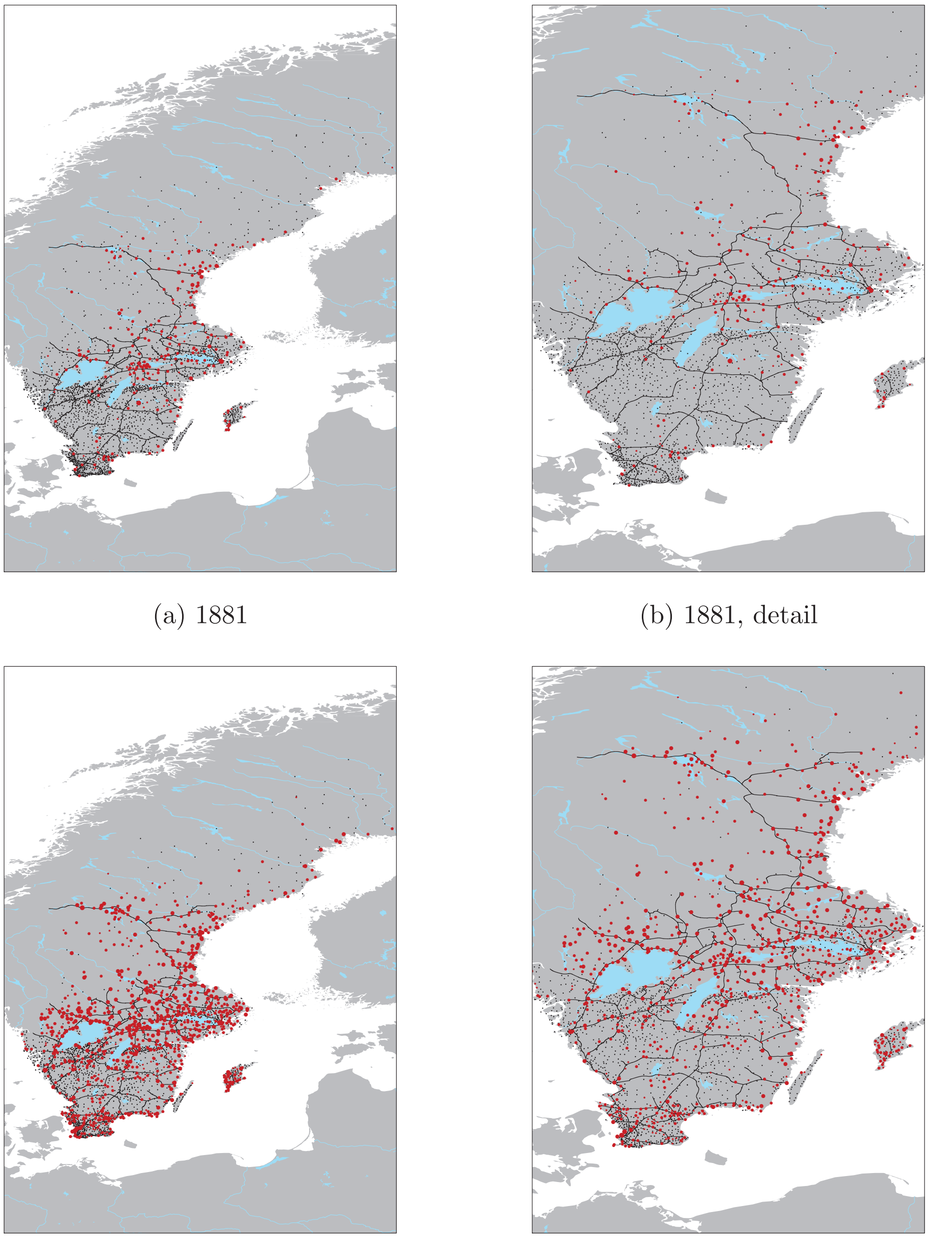
Note: Maps showing the spatial relationship between the actual railway network as of 1881 and the three counterfactual railway networks used in constructing my instrumental variable. See text for details.

Figure 1.5: First stage relationship over time



Note: Conditional correlations between proximity to railway and proximity to the counterfactual railway networks used in constructing my instrumental variable. Shown for select years. See text for details. All variables have been residualised with county fixed effects as well as controls for longitude and latitude. All distances have been transformed using an inverse hyperbolic sine transformation.

Figure 1.6: Spatial relationship between railways and social movements



(a) 1881

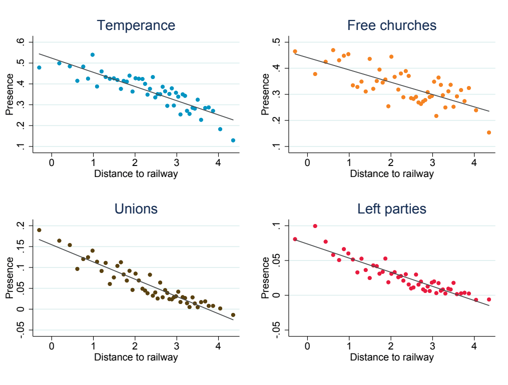
(b) 1881, detail

(c) 1890

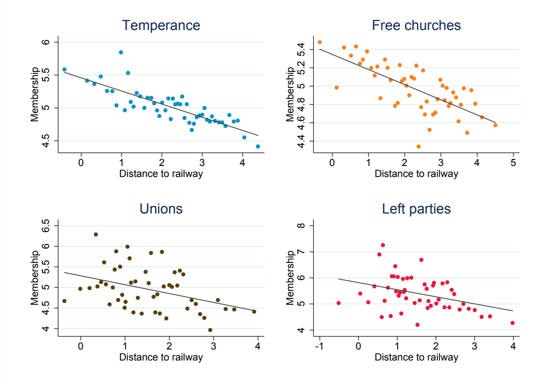
(d) 1890, detail

Note: Maps showing the spatial relationship between social movement presence and membership and railway access in two selected years. Black dots denote municipalities. Red circles denote municipalities with social movement presence. The size of the circle indicates absolute membership numbers.

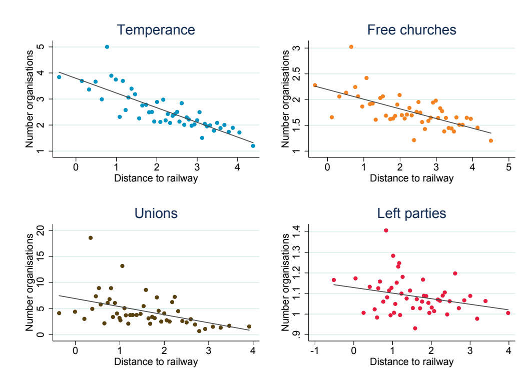
Figure 1.7: Correlations between railway access and social movement outcomes



(a) Presence



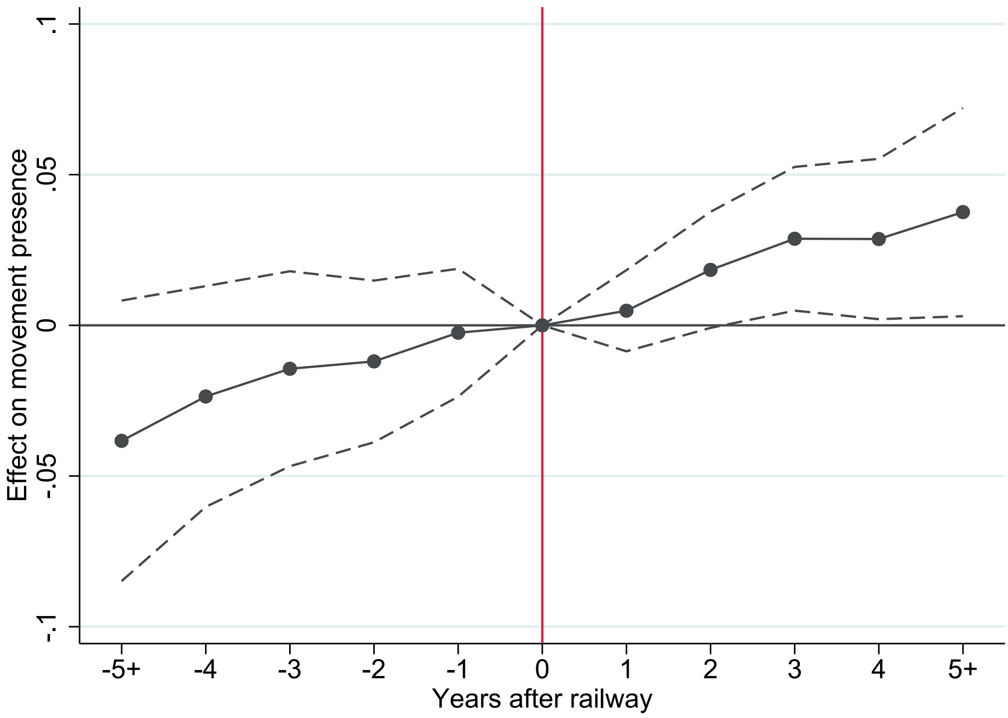
(b) Membership



(c) Number of organisations

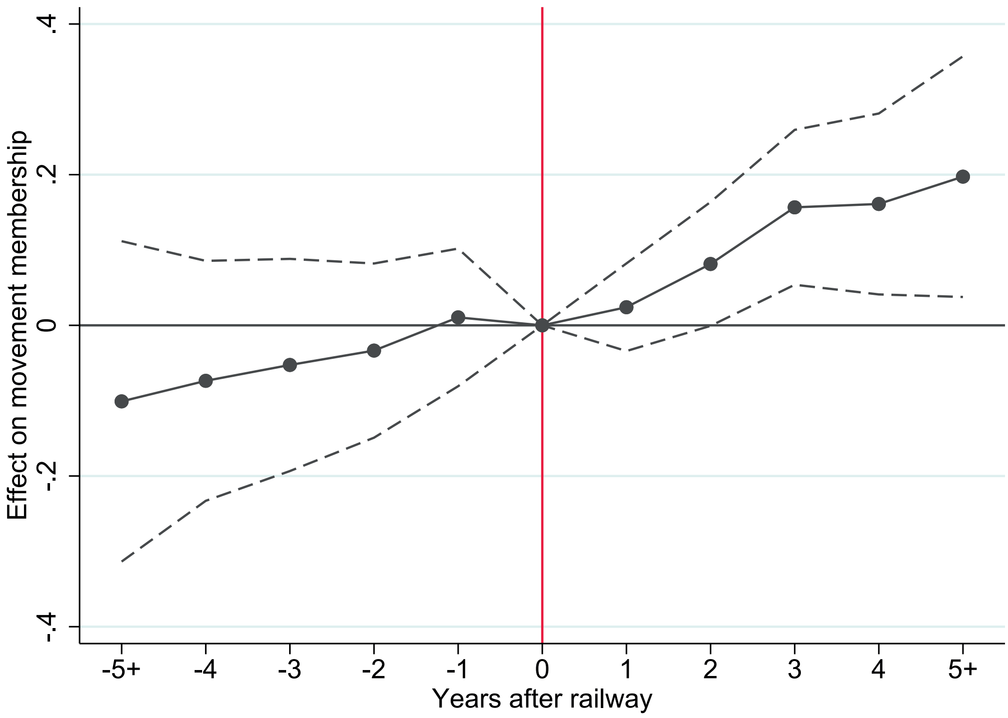
Note: Conditional correlations between social movement outcomes by type and railway access. All variables have been residualised with county fixed effects as well as controls for longitude and latitude. The "distance to railway" and "membership" variables have been transformed using an inverse hyperbolic sine transformation.

Figure 1.8: Event study: movement presence and railway within 10km



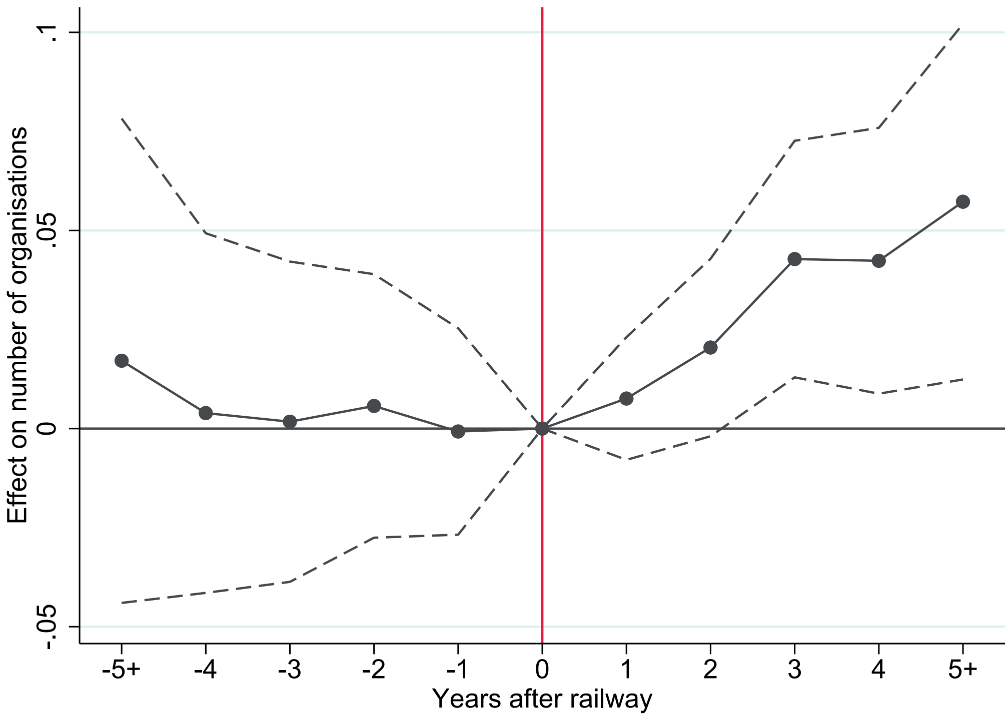
Note: Event study regressions of the form: $Y_{it} = \alpha_i + \gamma_t + \alpha_i \times t + \sum_{\tau=-5}^{5} \rho_{t+\tau} \mathbb{1}\{\text{Rail within 10km}\}_{it} + X'_{it}\beta + \epsilon_{it}$. The figure reports the sequence of $\rho_{t+\tau}$. 95% confidence intervals shown. Controls include: geography FE (distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects), baseline FE (demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects) and the inverse hyperbolic sine transformation of contemporaneous population.

Figure 1.9: Event study: movement membership and railway within 10km



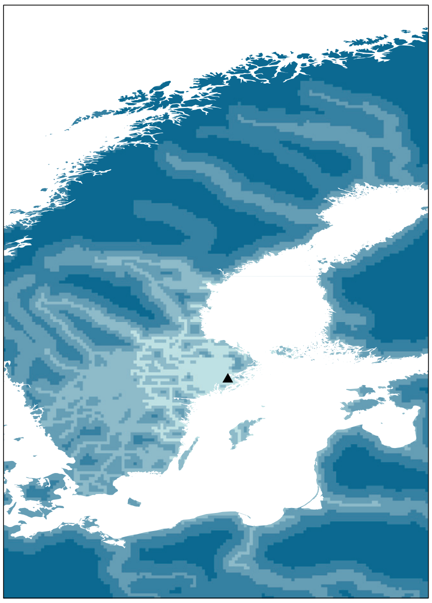
Note: Event study regressions of the form: $Y_{it} = \alpha_i + \gamma_t + \alpha_i \times t + \sum_{\tau=-5}^{5} \rho_{t+\tau} \mathbb{1}\{\text{Rail within 10km}\}_{it} + X'_{it}\,\beta + \epsilon_{it}$. The figure reports the sequence of $\rho_{t+\tau}$. 95% confidence intervals shown. Controls include: geography FE (distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects), baseline FE (demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects) and the inverse hyperbolic sine transformation of contemporaneous population.

Figure 1.10: Event study: number of organisations and railway within 10km

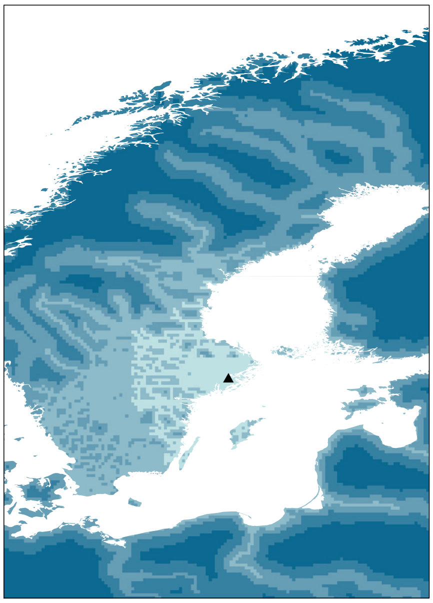


Note: Event study regressions of the form: $Y_{it} = \alpha_i + \gamma_t + \alpha_i \times t + \sum_{\tau=-5}^{5} \rho_{t+\tau} \mathbb{1}\{\text{Rail within 10km}\}_{it} + X'_{it}\beta + \epsilon_{it}$. The figure reports the sequence of $\rho_{t+\tau}$. 95% confidence intervals shown. Controls include: geography FE (distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects), baseline FE (demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects) and the inverse hyperbolic sine transformation of contemporaneous population.

Figure 1.11: Least costs to Stockholm over time



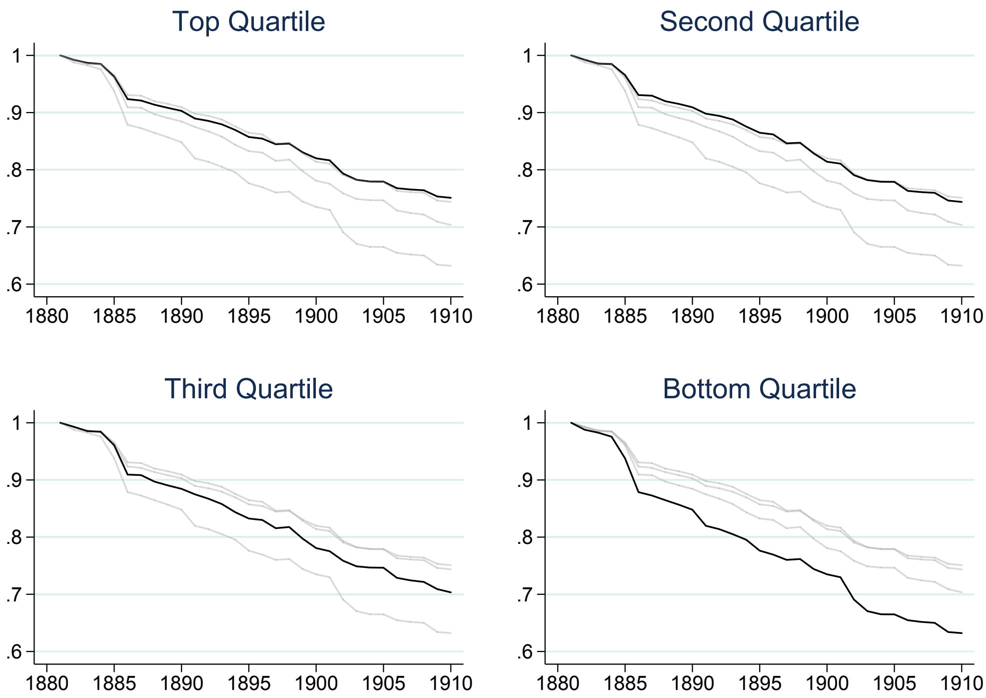
(a) 1881



(b) 1910

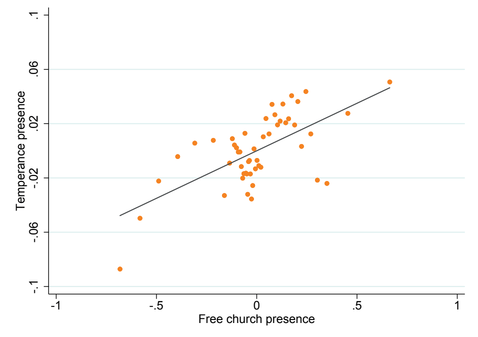
Note: Maps showing least costs to Stockholm at the start (1881) and end (1910) of the sample period. Logarithmic scale: a darker colour is twice as costly as the nearest lighter colour. See text and Appendix A for details on the construction of the least cost measures.

Figure 1.12: Least cost reductions over time

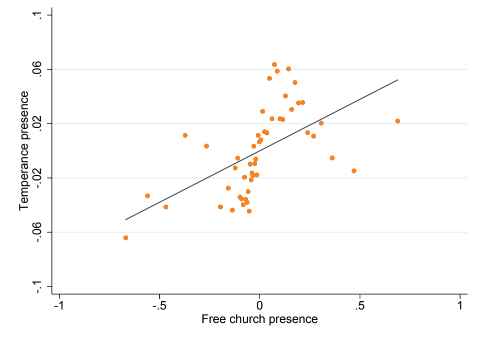


Note: Graphs showing the reductions in average least costs over time in relation to initial average least cost (cost normalised to 1 in 1881). Municpalities split according to initial cost as of 1881: the top quartile contains municipalities with the lowest average cost (i.e. the most connected municipalities), the second quartile those with the second lowest average cost, and so on.

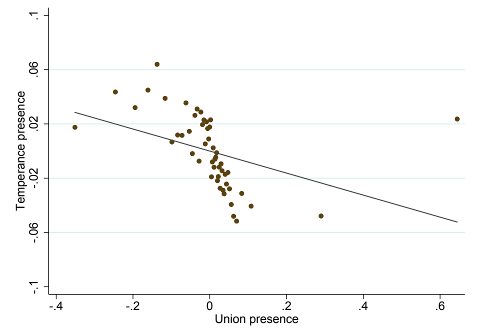
Figure 1.13: Cross-relationships between movement presences



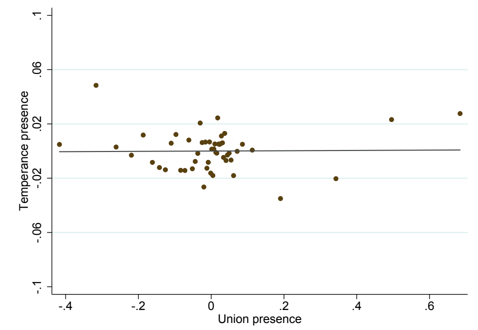
(a) Free churches, far from rail



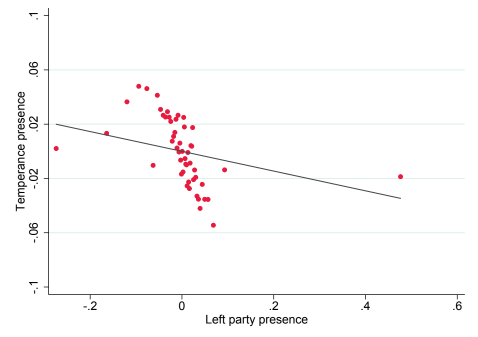
(b) Free churches, near rail



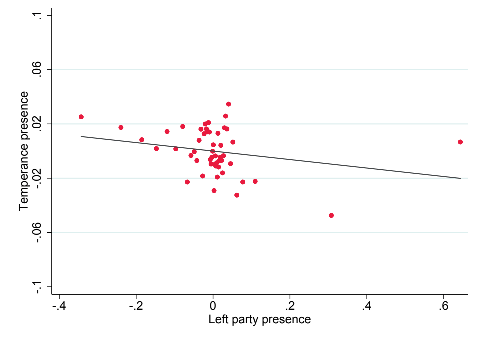
(c) Unions, far from rail



(d) Unions, near rail



(e) Left parties, far from rail



(f) Left parties, near rail

Note: Graphs showing the cross-relationships between temperance movement presence and the presence of the three other social movements, separately for municipalities near and far from the railway. All presence indicators have been residualised with municipality fixed effects, year fixed effects and the full set of controls.

1.11 Appendix A: Calculating Least Costs

Key to the discussion of "market access" in Section 1.6 above is the use of time-varying least costs between municipalities, Cost_{ijt}. This Appendix provides a sketch of the calculation of these cost terms.

The cost terms Cost_{ijt} are allowed to vary by year, t. Indeed, within- as well as between-variation in the least costs is crucial for identification in a panel framework. Variation in these terms comes from the expansion of the railway network, which reduces effective travel costs asymmetrically across municipalities.

Each year, therefore, one can calculate least costs using the following algorithm:

1. Divide Sweden into a $0.1° \times 0.1°$ grid.
2. Assign a cost to each grid cell using the following criteria: [28]
   - If the cell contains a major body of water (coast, river, lake), assign a cost of 0.49.
   - If the cell does not contain water, but contains railway, assign a cost of 0.63.
   - If the cell contains neither water nor railway, assign a cost of 23.1.
3. Construct a cost raster using the full grid of costs. See Figures 1.14a and 1.14c for examples.
4. For each of the 2,270 municipalities in the sample, calculate the travel cost to that municipality from every other muncipality. This is a minimisation problem over the least cost surface which picks the optimal route. See Figures 1.14b and 1.14d for examples of least costs to Stockholm.

[28] These cost parameters follow Donaldson and Hornbeck (2016), who in turn follow Fogel (1964). Perlman (2016) also uses the same cost values.

Each year, this results in over 5 million pairwise least cost terms, which can be collected in a cost matrix:

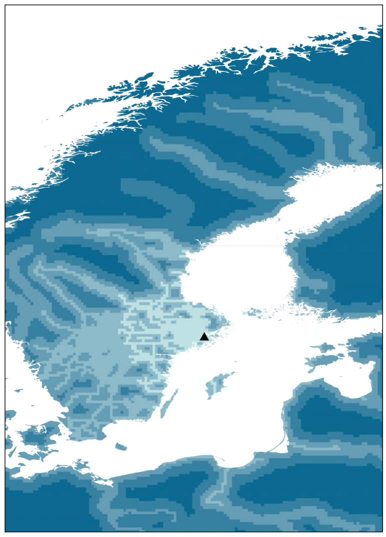
$$\mathbf{C}_t = \begin{bmatrix} \text{Cost}_{11}^{-\theta} & \text{Cost}_{12}^{-\theta} & \dots & \text{Cost}_{1n}^{-\theta} \\ \text{Cost}_{21}^{-\theta} & \text{Cost}_{22}^{-\theta} & \dots & \text{Cost}_{2n}^{-\theta} \\ \vdots & \vdots & \ddots & \vdots \\ \text{Cost}_{n1}^{-\theta} & \text{Cost}_{n2}^{-\theta} & \dots & \text{Cost}_{nn}^{-\theta} \end{bmatrix}_t$$

The sequence of cost matrices can then be used in various "market access"-style calculations.

1.11.1 Figures for Appendix A

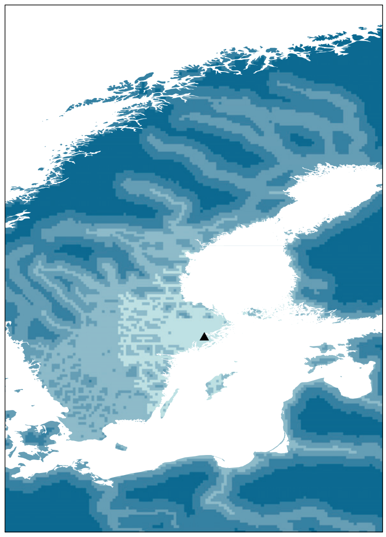
Figure 1.14: Calculating least costs

(a) Cost raster, 1881



(b) Least costs to Stockholm, 1881

(c) Cost raster, 1910



(d) Least costs to Stockholm, 1910

Note: Maps showing the construction of least cost maps and the cost raster used in this construction for the start (1881) and end (1910) of the sample period. See main text and the text in this appendix for details.

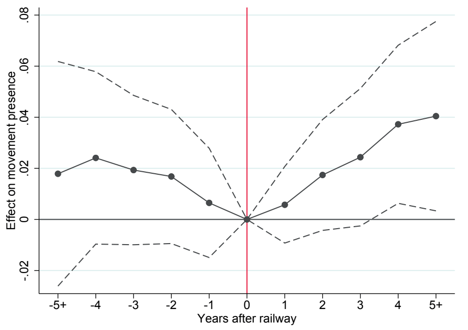
1.12 Appendix B: Additional Tables and Figures

Table 1.10: Instrument validity: distance to railway plans and pre-railway social movement outcomes

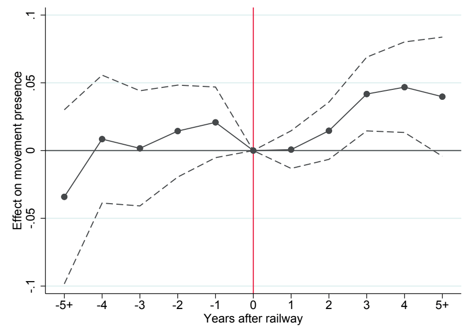
Dependent variable:	Presence of any social movement			Total membership		
Distance cut-off:	5km (1)	10km (2)	20km (3)	5km (4)	10km (5)	20km (6)
Distance to railway plans	-0.004 (0.013)	-0.022 (0.019)	-0.034 (0.041)	0.005 (0.058)	-0.072 (0.091)	-0.079 (0.176)
Observations	1489	981	468	1489	981	468
Municipalities	1489	981	468	1489	981	468
Outcome mean	0.115	0.119	0.150	0.509	0.532	0.685
Population controls	Y	Y	Y	Y	Y	Y
Geogr. controls	Y	Y	Y	Y	Y	Y
Baseline controls	Y	Y	Y	Y	Y	Y

Note: OLS regressions of the form: $\mathrm{Y}_i = \delta\ \mathrm{PlanDist}_i + \mathrm{X}'_{it}\ \beta + \eta_i$, using the first year of the sample only (1881). Different columns use different subsamples of municipalities: those further than 5, 10 and 20 kilometres from the constructed railway in 1881, respectively. Columns 1-3: the dependent variable is an indicator equal to 1 if any movement organisation is present in the municipality. Columns 4-6: the dependent variable is the inverse hyperbolic sine of total movement membership. Robust standard errors in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geography controls are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation). Baseline controls are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age). Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

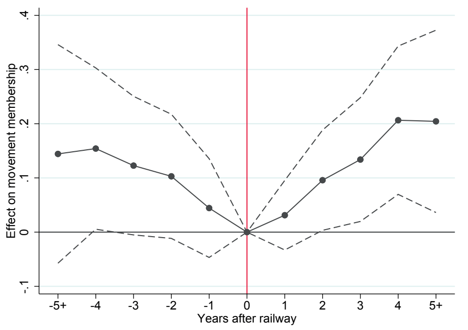
Figure 1.15: Event study with different distance cut-offs



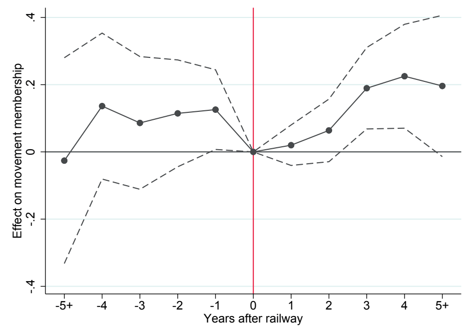
(a) Movement presence, 5km



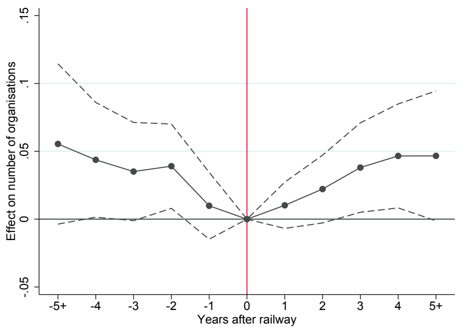
(b) Movement presence, 20km



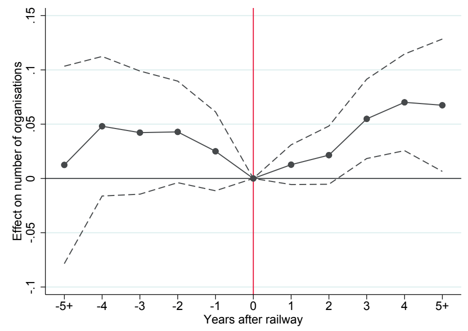
(c) Movement membership, 5km



(d) Movement membership, 20km



(e) Number organisations, 5km



(f) Number organisations, 20km

Note: Event study regressions of the form: $\text{Y}_{it} = \alpha_i + \gamma_t + \alpha_i \times t + \sum_{\tau=-5}^{5} \rho_{t+\tau} \mathbb{1}\{\text{Rail within Xkm}\}_{it} + \text{X}'_{it}\,\beta + \epsilon_{it}$. The figure reports the sequence of $\rho_{t+\tau}$. 95% confidence intervals shown. Controls include: geography FE (distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects), baseline FE (demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects) and the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.11: Reduced form

	Dependent variable: see panel headings		
	(1)	(2)	(3)
Panel A. Dependent variable: movement presence			
Distance to railway plans × 1890	-0.001	0.008	0.009
	(0.010)	(0.010)	(0.010)
Distance to railway plans × 1900	0.032***	0.034***	0.034***
	(0.011)	(0.012)	(0.012)
Panel B. Dependent variable: growth of membership per 1000 inhabitants			
Distance to railway plans × 1890	1.386***	1.233***	1.232***
	(0.389)	(0.360)	(0.360)
Distance to railway plans × 1900	0.888***	0.757***	0.756***
	(0.292)	(0.292)	(0.292)
Panel C. Dependent variable: growth of organisations per 1000 inhabitants			
Distance to railway plans × 1890	0.028***	0.025***	0.025***
	(0.006)	(0.007)	(0.007)
Distance to railway plans × 1900	0.037***	0.033***	0.033***
	(0.007)	(0.007)	(0.007)
Panel D. Dependent variable: membership concentration			
Distance to railway plans × 1890	-0.009	-0.009	-0.009
	(0.006)	(0.006)	(0.006)
Distance to railway plans × 1900	-0.019***	-0.017***	-0.016**
	(0.006)	(0.006)	(0.006)
Observations	68100	68100	68100
Municipalities	2270	2270	2270
Clusters	2270	2270	2270
Mun. FE	Y	Y	Y
Year FE	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y
Baseline chars. × Year FE		Y	Y
Population controls			Y

Note: reduced-form regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \sum_d \delta_d \,\mathrm{PlanDist}_i \times \mathbb{1}\{\text{decade} = d\}_t + \mathrm{X}'_{it}\,\beta + \epsilon_{it}$. 1880 is the omitted decade. Dependent variables are defined as follows. Panel A: indicator equal to 1 if any movement organisation is present in the municipality. Panel B: growth rate of membership per capita: $\Delta\frac{\text{Total members}}{\text{Population}}$. Panel C: growth rate of the number of organisations per 1000 inhabitants: $\Delta\frac{\text{Total number of organisations}}{\text{Population/1000}}$. Panel D: share of movement membership captured by the largest organisation. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.12: Robustness to different variable transformations

Transformation:	Inverse hyperbolic sine		Natural logarithm	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Panel A. Dependent variable: movement presence				
Distance to rail	-0.008	-0.199***	-0.003	-0.222***
	(0.006)	(0.073)	(0.005)	(0.086)
Panel B. Dependent variable: growth of membership per 1000 inhabitants				
Distance to rail	-0.540***	-6.398***	-0.386***	-6.938***
	(0.168)	(2.070)	(0.142)	(2.312)
Panel C. Dependent variable: growth of organisations per 1000 inhabitants				
Distance to rail	-0.018***	-0.221***	-0.014***	-0.255***
	(0.005)	(0.048)	(0.004)	(0.059)
Panel D. Dependent variable: membership concentration				
Distance to rail	0.001	0.086**	0.000	0.081*
	(0.004)	(0.038)	(0.003)	(0.042)
Mun. FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Population controls	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y	Y

Note: OLS and IV regressions of the form: $\text{Y}_{it} = \alpha_i + \gamma_t + \phi\,\text{DistRail}_{it} + \text{X}'_{it}\,\beta + \epsilon_{it}$. Columns 1 and 2 report baseline results using the inverse hyperbolic sine transformation of distance to rail. Columns 3 and 4 use the natural logarithm. Dependent variables are defined as follows. Panel A: indicator equal to 1 if any movement organisation is present in the municipality. Panel B: growth rate of membership per capita: $\Delta\frac{\text{Total members}}{\text{Population/1000}}$. Panel C: growth rate of the number of organisations per 1000 inhabitants: $\Delta\frac{\text{Total number of organisations}}{\text{Population/1000}}$. Panel D: share of movement membership captured by the largest organisation. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.13: Robustness to different standard error structures

Standard errors:	Clustered by municipality		Clustered by grid cell		Conley spatial SE	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Dependent variable: movement presence						
Distance to rail	-0.008	-0.190***	-0.008	-0.190**	-0.008	-0.190***
	(0.006)	(0.071)	(0.007)	(0.096)	(0.006)	(0.066)
Panel B. Dependent variable: growth of membership per 1000 inhabitants						
Distance to rail	-0.540***	-6.398***	-0.540***	-6.398***	-0.540***	-6.398**
	(0.167)	(2.007)	(0.190)	(2.249)	(0.181)	(3.019)
Panel C. Dependent variable: growth of organisations per 1000 inhabitants						
Distance to rail	-0.018***	-0.263***	-0.018***	-0.263***	-0.018***	-0.263***
	(0.005)	(0.047)	(0.006)	(0.068)	(0.006)	(0.081)
Panel D. Dependent variable: membership concentration						
Distance to rail	0.001	0.090**	0.001	0.090**	0.001	0.090***
	(0.004)	(0.036)	(0.004)	(0.039)	(0.003)	(0.033)
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Population controls	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y	Y	Y	Y

Note: OLS and IV regressions of the form: $\text{Y}_{it} = \alpha_i + \gamma_t + \phi \text{DistRail}_{it} + \text{X}'_{it}\beta + \epsilon_{it}$. Dependent variables are defined as follows. Panel A: indicator equal to 1 if any movement organisation is present in the municipality. Panel B: growth rate of membership per capita: $\Delta \frac{\text{Total members}}{\text{Population/1000}}$. Panel C: growth rate of the number of organisations per 1000 inhabitants: $\Delta \frac{\text{Total number of organisations}}{\text{Population/1000}}$. Panel D: share of movement membership captured by the largest organisation. Standard error structure differs by columns. Columns 1 and 2 cluster by municipality (2,270 clusters). Columns 3 and 4 cluster by 1 deg ×1 deg grid cells (232) clusters. Columns 5 and 6 implement Conley spatial standard errors, allowing for spatial correlation up to 100km. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.14: Robustness to different population interpolations

Population interpolation:	Constant growth rate		Linear		Fixed	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Dependent variable: movement presence						
Distance to rail	-0.008	-0.199***	-0.008	-0.199***	-0.009	-0.198***
	(0.006)	(0.073)	(0.006)	(0.073)	(0.006)	(0.073)
Panel B. Dependent variable: growth of membership per 1000 inhabitants						
Distance to rail	-0.540***	-6.398***	-0.530***	-6.408***	-0.695***	-5.908***
	(0.168)	(2.070)	(0.168)	(2.072)	(0.186)	(2.114)
Panel C. Dependent variable: growth of organisations per 1000 inhabitants						
Distance to rail	-0.018***	-0.221***	-0.018***	-0.221***	-0.023***	-0.206***
	(0.005)	(0.048)	(0.005)	(0.048)	(0.005)	(0.048)
Panel D. Dependent variable: membership concentration						
Distance to rail	0.001	0.086**	0.001	0.086**	0.001	0.087**
	(0.004)	(0.038)	(0.004)	(0.038)	(0.004)	(0.039)
Mun. FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Population controls	Y	Y	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y	Y	Y	Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi \mathrm{DistRail}_{it} + \mathrm{X}'_{it}\beta + \epsilon_{it}$. Dependent variables are defined as follows. Panel A: indicator equal to 1 if any movement organisation is present in the municipality. Panel B: growth rate of membership per capita: $\Delta \frac{\text{Total members}}{\text{Population}/1000}$. Panel C: growth rate of the number of organisations per 1000 inhabitants: $\Delta \frac{\text{Total number of organisations}}{\text{Population}/1000}$. Panel D: share of movement membership captured by the largest organisation. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.15: Robustness to dropping nodal municipalities

Sample:	Full		Drop nodal municipalities	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Panel A. Dependent variable: movement presence				
Distance to rail	-0.008	-0.199***	-0.008	-0.204***
	(0.006)	(0.073)	(0.006)	(0.074)
Panel B. Dependent variable: growth of membership per 1000 inhabitants				
Distance to rail	-0.540***	-6.398***	-0.538***	-6.181***
	(0.168)	(2.070)	(0.168)	(2.093)
Panel C. Dependent variable: growth of organisations per 1000 inhabitants				
Distance to rail	-0.018***	-0.221***	-0.018***	-0.220***
	(0.005)	(0.048)	(0.005)	(0.049)
Panel D. Dependent variable: membership concentration				
Distance to rail	0.001	0.086**	0.001	0.099**
	(0.004)	(0.038)	(0.004)	(0.043)
Mun. FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Population controls	Y	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y	Y

Note: OLS and IV regressions of the form: $\mathrm{Y}_{it} = \alpha_i + \gamma_t + \phi \mathrm{DistRail}_{it} + \mathrm{X}'_{it}\beta + \epsilon_{it}$. Columns 1 and 2 report baseline results using the full sample. Columns 3 and 4 use a subsample excluding the nodal municipalities targeted in the plans used in the construction of the instrumental variable. Dependent variables are defined as follows. Panel A: indicator equal to 1 if any movement organisation is present in the municipality. Panel B: growth rate of membership per capita: $\Delta\frac{\text{Total members}}{\text{Population/1000}}$. Panel C: growth rate of the number of organisations per 1000 inhabitants: $\Delta\frac{\text{Total number of organisations}}{\text{Population/1000}}$. Panel D: share of movement membership captured by the largest organisation. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Table 1.16: Alternative mechanisms: shares in major occupational sectors

	Dependent variable: share employed in		
	Services	Agriculture	Industry
	(1)	(2)	(3)
Distance to railway	0.010*	-0.009	-0.012
	(0.006)	(0.012)	(0.009)
Observations	68100	68100	68100
Municipalities	2270	2270	2270
Clusters	2270	2270	2270
Outcome mean	0.180	0.514	0.147
Mun. FE	Y	Y	Y
Year FE	Y	Y	Y
Population controls	Y	Y	Y
Geogr. chars. × Year FE	Y	Y	Y
Baseline chars. × Year FE	Y	Y	Y

Note: IV regressions of the form: $Y_{it} = \alpha_i + \gamma_t + \phi\,\text{RailDist}_{it} + X'_{it}\,\beta + \epsilon_{it}$. The dependent variable is the share of the population employed in major occupational sectors. Military and miscellaneous employment categories not included. Standard errors clustered by municipality in parentheses. *, ** and *** indicate significance at the 10, 5 and 1 percent levels, respectively. Geographical characteristics are: distance to the capital (Stockholm), distance to nodal towns, distance to coast, elevation (all transformed using an inverse hyperbolic sine transformation) interacted with year fixed effects. Baseline characteristics are demographic characteristics in the baseline 1880 census (adult population, employment shares in 10 major ISCO groups, average age) interacted with year fixed effects. Population controls is the inverse hyperbolic sine transformation of contemporaneous population.

Chapter 2

Creating 'Us and Them':

Racial Propaganda, Insularity and Right-Wing Ideology

2.1 Introduction

Recent resurgences of nationalist and anti-immigration sentiment in Europe and elsewhere have received widespread attention in popular, political and academic spheres. When viewed as a backlash against globalisation, a potential implication of this resurgence is the adoption of welfare-reducing inward-looking trade and migration policies. Furthermore, heightened conflict within societies may spark mistrust and disagreement (for example regarding the provision of public goods). Despite the growing influence of such movements, relatively little attention has been paid to the determinants of their resurgence. In this chapter, I explore the historical roots of such movements in the Swedish context, paying particular attention to the

This chapter has benefited greatly from discussions with Sascha O. Becker, Clément de Chaisemartin, Mirko Draca, James Fenske, Andreas Ferrara, Mounir Karadja, Omiros Kouvavas, Alexey Makarin, Martina Miotto, Nico Voigtländer, Fabian Waldinger, Guo Xu and Noam Yuchtman. Participants at CAGE Research Day (Warwick), Spring Meeting of Young Economists (Halle/Saale), Young Economists' Meeting (Brno), CAGE-EHES-IAS Summer School (Warwick), ASREC Europe Conference (Bologna), the Annual Meeting of the Danish Society for Economic and Social History (Copenhagen Business School), Leicester Ph.D. Conference (Leicester), the RES Symposium of Junior Researchers (Sussex), Warwick Ph.D. Conference (Warwick), the EBE Summer Meeting (Munich), the World Economic History Congress (Boston) and the Workshop on Interwar Economic History (London School of Economics) provided valuable comments.

role of identity-based racial propaganda in creating persistent support for right-wing movements.

The chapter documents the impact of the Swedish *State Institute for Race Biology* in the first half of the twentieth century in popularising a racial worldview, in particular through its publication of a condensed version of an anthropometric study classifying the Swedish population according to "Nordic purity". The book was intended for use in schools and in public libraries, with the aim of making race more socially and politically salient. Race-biological ideas were quickly assimilated even into moderate right-wing rhetoric, and continue to inform the Swedish radical right to this day.

In this chapter, I show that regions deemed particularly "Swedish" by the *Institute* exhibit relatively more support for right-wing parties following the publication of the text. Additionally, using registries of the *Institute's* correspondence, I provide evidence that these regions also became more directly involved with the work of the *Institute*. I link the embracing of racial rhetoric in the interwar period to increased support for populist anti-immigration parties today. In this sense, I attempt to synthesise explanations for the historical formation of political and social worldviews with their resurfacing in the present.

I investigate the contemporaneous effect of the publication of the popular text on support for right-wing parties by constructing a panel of election outcomes. The panel covers all Swedish election districts in the eight elections from 1917 to 1940. Implementing a difference-in-differences framework, I show that the publication caused districts of above-median "Swedishness" to exhibit a 3.4 percentage point higher vote share for right-wing parties in the elections after the publication. The estimated effect is robust to a number of confounders, including the potentially differential political impacts of the Great Depression and interwar immigration. Analyses of the heterogeneity of the effect indicate that it is driven by districts with little immigration prior to the publication of the book, which suggests that insular communities may be especially susceptible to this type of racial rhetoric.

To provide evidence for the claim that the effect is driven by the publication of the book, I collect data on state funding of public and school libraries, and use this as a proxy for the accessibility of the book. I show that the "Swedishness" effect is concentrated in districts with above-median library funding, in particular those districts with above-median funding of *school* libraries. This result is in line with the notion that propaganda has the largest impact at a young age.

Using data on local and national newspapers, I construct an index of media exposure to race-biological topics to shed light on the role of media as a moderator of the impact of propaganda. I show that districts of high "Swedishness" vote significantly more for the right wing following the publication of the propagandistic book only in districts of above-median media exposure. This result underscores the central role of media in the spread of (radical) ideas.

To corroborate the claim that increased support for right-wing parties is indicative of support for a racial paradigm in this period, I collect data on the incoming correspondence of the *Institute* and construct a district-level panel of correspondence. Difference-in-differences estimates suggest that above-median "Swedishness" regions corresponded more intensively with the *Institute* following the publication of the text.

Finally, I provide a possible explanation for the current resurfacing of right-wing populism in Sweden: if particularly "Swedish" districts turned to the right and embraced racial rhetoric in the interwar period, then these ideas may have persisted locally over time. To investigate this possibility, I estimate a "long" difference-in-differences regression by extending my analysis to include the recent election successes of the Sweden Democrats (a populist party with roots in the extreme right). The "Swedishness" effect persists to the present day: on average, above-median "Swedish" regions exhibit a 0.4 standard deviation relative increase in the vote share of right-wing parties in the extended post-treatment period. This suggests that propaganda efforts may have effects that extend far beyond their immediate contemporaneous impact, in particular in light of recent evidence for the persistence and intergenerational transmission of political preferences and social norms.

This chapter relates to a number of strands in the literature. In documenting the *Institute's* efforts to influence the social and political landscape with its propagandistic text, it speaks to the literature on information interventions and their effects on preferences. A recent example is Cantoni, Chen, Yang, Yuchtman and Zhang's study of a textbook reform in China, which documents a shift towards more positive views on Chinese governance and greater scepticism towards free markets in affected regions (Cantoni et al., 2017). Most thematically related to the present study is Voigtländer and Voth's paper on the long-run effects of Nazi indoctrination on anti-Semitic attitudes in Germany (Voigtländer and Voth, 2015).

There is also a strand of the literature on the persistence of extremist politics over time. Such persistence can manifest itself within regions: Ochsner and Roesel show that National Socialists migrating within Austria after the Second World War brought their extreme politics with them, resulting in higher vote shares for right-wing parties to the present day (Ochsner and Roesel, 2017). Persistence can also take place within dynasties: Avdeenko and Siedler document the intergenerational transmission of right-wing party preferences and anti-immigration sentiment in Germany (Avdeenko and Siedler, 2017). Understanding the persistence of extremist politics is particularly interesting in the Swedish case, given recent interest in explaining the rise of the Sweden Democrats (Valdez (2014), Strömblad and Malmberg (2016), Dehdari (2018)).

This chapter relates to the literature on cultural persistence more generally. Theoretical contributions in this field include Bisin and Verdier's model of cultural transmission, in which parents pass on their preferences to their offspring (Bisin and Verdier, 2001), and Anderlini, Gerardi and Lagunoff's model of social memory, in which conflicts persist due to societies' vicarious views about their pasts (Anderlini et al., 2010). Empirical contributions include Nunn and Wantchekon's study of the slave trade as the root of mistrust in Africa (Nunn and Wantchekon, 2011) and Voigtländer and Voth's work on the medieval origins of anti-Semitism in Nazi Germany (Voigtländer and Voth, 2012).

To the extent that the activities of the *Institute* engendered intra-societal divisions, this chapter also speaks to the literature on conflict. In a seminal theoretical contribution, Glaeser explores the interaction between voters' demand for hate-creating stories attacking "out-groups" and politicians' willingness to supply such stories (Glaeser, 2005). In recent empirical work, Becker and Pascali study the economic determinants of such antagonisms in the context of German anti-Semitism (Becker and Pascali, 2019). Highly related to the present study is Yanagizawa-Drott's paper on the role of mass media in the Rwandan genocide (Yanagizawa-Drott, 2014), and Blouin and Mukand's recent paper on its role in the reconstruction of Rwandan identity (Blouin and Mukand, 2019).

In its exploration of the impact of a propaganda effort, this work speaks to the recent literature on the impact of media on economic, social and political outcomes. In a historical context, Adena, Enikolopov, Petrova, Santarosa and Zhuravskaya provide evidence that radio played an important role in the rise of the National Socialists in Germany, in particular in consolidating the dictatorship once in power (Adena et al., 2015). In a contemporary setting, DellaVigna and Kaplan document the effects of bias in news media on voting behaviour (DellaVigna and Kaplan, 2007). As for social outcomes, there is growing evidence that media influences can affect a range of outcomes, such as crime (Dahl and DellaVigna, 2009), divorce (Chong and La Ferrara, 2009) and fertility (Kearney and Levine, 2015; La Ferrara et al., 2012).

Finally, this chapter fits into a small but growing economics literature on Swedish political history. Recent examples include Tyrefors Hinnerich and Pettersson-Lidbom's study of the difference in redistributive policies between direct and representative democracies (Tyrefors Hinnerich and Pettersson-Lidbom, 2014) and Karadja and Prawitz's paper on the effects of large-scale emigration on citizens' bargaining power in the origin communities and its resulting impact on political institutions (Karadja and Prawitz, 2019).

The contribution of this chapter is in its exploration of the effect of a propaganda intervention in the short- and long-run. It documents how identity-based propaganda can have both the intended contemporaneous effect and a longer-lasting latent effect due to local transmission of preferences and culture. It seeks to fuse the literature on the effect of the formation of political preferences with that of long-run cultural persistence, and in so doing to propose a potential explanation for the recent resurgence of nationalist political rhetoric.

2.2 Historical Background

2.2.1 The *State Institute for Race Biology*

The Swedish *State Institute for Race Biology* was founded in Uppsala in January 1922 for the study and public dissemination of research in eugenics and human genetics. Its appointed head was physician Herman Lundborg, who championed the *Institute* and its race-biological publications for the majority of the interwar period. Lundborg's ideas shaped the output of the *Institute*, in particular his view of race biology as not only a science, but as a complete *Weltanschauung* (Broberg, 1995). He was replaced by the more moderate Gunnar Dahlberg in 1936, after which the *Institute* abandoned much of its emphasis on racial hygiene for more neutral research in hereditary genetics.

The *Institute's* key work was an ambitious anthropometric survey of the Swedish population, with the aim of producing a systematic classification of the predominant racial elements in different parts of the country. In the early 1920s, the *Institute* carried out comprehensive physical measurements of over 100,000 Swedish conscripts. Among the characteristics recorded were stature, hair and eye colour, morphological index and cephalic index.[1] The results of the study were published in the 1926 volume *The Racial Characters of the Swedish Nation* (Linders and Lundborg, 1926), a work in English whose intended audience was the international scientific community. The work was met with universal acclaim for its rigour, and copies were distributed globally.

On Lundborg's initiative, a popular, condensed version of the work was prepared for the purpose of educating the Swedish population. The result was the Swedish-language *Svensk Raskunskap* (Swedish Racial Studies (Lundborg, 1927)), which appeared in late-1927 and was intended for secondary school students and the general public. The study reproduced the key results of the scientific text, including maps of the spread of the "archetypal Nordic type" (see Figure 2.1). It also included a rich collection of photographs of racial archetypes (see Figures 2.2 and 2.3). Kjellman documents the intensely visual aspect of Swedish race biology, including the manipulative use of younger individuals to represent the Nordic archetype and older individuals for other archetypes (Kjellman, 2013).

In contrast with the relatively reserved vocabulary of the scientific work, Lundborg took the liberty to engage in moralistic racial rhetoric in the popular version:

> "Archaeological research, race biology, and history have shown evidence of the strength, entrepreneurship, organizational skill, ability, and talent of the Nordic race. All this obligates us. May we, who now live in this primeval abode of the Nordic race, do everything to keep this race in good health and save it from degeneration and extinction."[2]

[1] The morphological index concerns the proportions of the face, while the cephalic index concerns the proportions of the skull. Individuals with long skulls (*dolichocephalic*) have a low cephalic index and were considered more Swedish, while individuals with short skulls (*brachiocephalic*) have a high cephalic index and were considered less Swedish.

[2] Quotation from Lundborg (1927). Translation as in Kjellman (2013). The original text reads: "Fornforskning, rasbiologi och historia bära samfällt vittnesbörd om den nordiska rasens sega kraft, företagsamhet, begåvning och organisationsförmåga. Allt detta förpliktigar. Må vi, som nu leva i den nordiska rasens urhem, göra allt vad på oss ankommer för att hålla rasen uppe, så att den ej urartar eller dör ut."

The book proved very popular. Its two editions, with a combined run of 10,000 copies, soon sold out, and its readership was likely much larger due to its use in schools and libraries. It received widespread media attention in national as well as local newspapers, and sparked a national debate about questions of race and fertility. Figures 2.13 and 2.14 in the Appendix provide examples of this type of media attention. The head of the *Institute*, Herman Lundborg, was briefly launched into stardom, and was featured in various newspapers and journals.

The work of the *Institute* played no small part in shaping Swedish social thought. Its racial ideas influenced right-wing parties of the period (Lööw, 2004), and continues to inform white power organisations to the present day (Lööw, 2000, 2015). Its more moderate contributions to hereditary genetics influenced social-democratic governments well into the post-war era (Broberg and Tydén, 2005). This chapter attempts to quantify its short run impact on political outcomes and engagement with race-biological ideas, and explores potential links between racial paradigms of the past with the rise of populist anti-immigration parties of the present.

2.2.2 Swedish Politics in the Interwar Period

In 1917, as a result of decades of gradual democratisation, the ruling monarch King Gustav V formally acknowledged the parliamentary principle and Sweden became a parliamentary democracy in the full sense. Universal suffrage for men was introduced in the election of the same year, and that of women followed in the 1921 election. The 1920s were a decade of parliamentary pluralism, with five major political camps: Social Democrats, conservative Right, Liberals, Farmers and the radical Left. Further divisions surfaced as parties split and recoalesced, with the liberals, farmers and leftists notably represented by more than one party in several elections. As a result, the political discourse of the period was often confrontational, and fragile political coalitions were the norm.

The Great Depression did not spare Sweden. Unemployment rose sharply, as elsewhere in Europe. In response to the crisis, an agreement was struck between the Social Democrats and Farmers. They introduced a more Keynesian fiscal policy as well as price controls for agricultural goods. Coupled with an early departure from the gold standard, the policy package ensured Sweden's relatively rapid recovery from the Depression. The period has been described as politically formative for two main reasons (Möller, 2015). First, it saw the beginning of social-democratic hegemony in Swedish politics: from the 1932 election until the end of the century, the Social Democrats were only in opposition for a total of nine years. Second, it marked the beginning of consensus politics (*samförståndspolitik*), in which broad coalitions and agreements were the norm, and sharp political confrontation avoided.

The political trends are evident in Figure 2.4. The Social Democrats' rise is particularly striking, as is the slow decline of the traditional bourgeois parties (the conservative Right and the Liberals). Of further note is the relatively modest development of parliamentary National Socialism. The term "Nationalists" is used here as a catch-all phrase for all the various parties with National Socialist or Fascist streaks which broke out of local radical spheres to take part in national elections. The various groups are documented in detail in Lööw's landmark study of early Swedish Nazism (Lööw, 2004).

Given that Swedish Nazi groups never developed into a serious political force, Berggren asks - "why bother?" (Berggren, 2002). The answer she provides to this (rhetorical) question is that it is important to explain why Fascism and Nazism could develop *at all* in Sweden, given a political climate which was *prima facie* infertile to such ideas. Two further, in my view more salient, reasons can be given. First, the pioneering National Socialists inspired and informed generations of Nazi sympathisers and white supremacists throughout the remainder of the twentieth century. Understanding these roots therefore aids in understanding current right-wing extremism. Second, the threat of National Socialism provoked responses in other political parties. Lindström studies this phenomenon, and notes in particular the readiness of the conservative Right to accommodate the nationalists, not least in response to the defection of some delegates and much of its youth wing to various nationalist groups (Lindström, 1985).

The racial worldview of the *Institute* was partly mirrored in right-wing political rhetoric. The National Socialists openly espoused such ideas, often with more than a hint of anti-Semitism (Lööw, 2004). The archetypal Swede even featured in its campaign posters as a champion of anti-capitalism and anti-communism (see Figure 2.15 in the Appendix).

Similar sentiments were evident even in established mainstream parties. The conservative Right had always adopted a patriotic nationalism (see Figure 2.16 in the Appendix), but in the 1930s more radical population politics entered its election manifestos:

> "Encouragement of the forming of families. Fast and powerful measures to the protection of the Swedish population material's persistence."[3]

This chapter explores whether the *Institute's* popularisation of race biology, as manifested in the 1927 popular text described above, influenced the development of racial sentiment in Sweden and resulted in larger support for the right-wing parties giving voice to such concerns. In particular, since the *Institute* sought to popularise a notion of "Swedishness" based on anthropometric characteristics, and distributed information which individuals could use to identify archetypal Swedes, did it engender especial support for racial rhetoric in particularly "Swedish" areas?

[3]Translation as in (Lindström, 1985). Original text reads: "Stöd åt familjebildningen. Snabba och verksamma åtgärder tillskydd för det svenska folkmaterialets bestånd."

2.3 Data

2.3.1 Data on Historical Elections

I construct a panel of electoral outcomes for all Swedish election districts (*härader*) over the eight elections between 1917 and 1940. All data on voting and supporting information are taken from various series of *Sveriges Officiella Statistik* (Official Statistics of Sweden), published on a yearly basis by *Statistiska Centralbyrån* (Statistics Sweden). The resulting panel consists of 383 districts and eight elections. Descriptive statistics are presented in Panel A of Table 2.1.

2.3.2 The *Institute's* Race-Biological Data

To reconstruct the "Swedishness" of each election district according to the *Institute's* criteria, I use the anthropometric data presented in Linders and Lundborg (1926). These data are based on measurements of the universe of Swedish conscripts in the years 1922 and 1923 (around 100,000 individuals in all), and therefore provide ample coverage of all parts of the country.[4] The source provides me with the distribution of key anthropometric variables associated with around 2,500 settlements, which I match with election districts to create measures of "Swedishness" on the election district level. Descriptive statistics are presented in Panel B of Table 2.1.

2.3.3 Data from the *Institute's* Archives

In Section 2.4.5, I explore the role of local newspapers in moderating the effect of the *Institute's* propaganda. To this end, I hand-collected data on the coverage of the *Institute's* activities in local newspapers using materials from the *Institute's* archive in Uppsala. These data are discussed in more detail in Section 2.4.5 below.

[4]Conscripts are, of course, a selected sample. This is not problematic for the present study for two reasons. First, conscripts are likely to differ systematically from the overall population only on height measurements, not on the key cephalic index variable (Linders and Lundborg, 1926). Second, since in this chapter I am interested on the *relative* "Swedishness" of different election districts, selection into conscription is not an issue so long as this does not differ systematically between districts. This is unlikely due to the universality of conscription in this period.

Besides its role in shaping electoral outcomes, I also investigate the effect of the *Institute's* propaganda on direct engagement with the *Institute*. Again, I draw on material from the *Institute's* archive. In particular, using registries of the *Institute's* incoming correspondence, I construct a district-level yearly panel of engagement, which I describe fully in Section 2.5.

2.3.4 Other Data

I make use of a range of additional data sources. Using various series of *Sveriges Officiella Statistik* (Official Statistics of Sweden), I compile a number of control variables, such as the population of a district, its level of urbanity and industrialisation, measures of poverty and unemployment and measures of immigration. I present descriptive statistics in Panel C of Table 2.1.

In exploring the mechanisms of my main effect, I make use of data on the funding of public libraries which I hand-collected from the archives of *Skolöverstyrelsen* (The Swedish Board of Education). I describe these data more fully in Section 2.4.4 below.

Finally, in Section 2.6, I link the present-day resurgence of right-wing populism in Sweden to the historical identity-based propaganda of the *Institute*. I therefore assemble a municipality-level dataset of contemporary elections and a range of control variables using various data freely available through Statistics Sweden.

2.4 The Impact on Electoral Outcomes, 1917-1940

To investigate the effect of the *Institute's* attempt to popularise a race-biological paradigm, I employ a differences-in-differences empirical strategy. In particular, I estimate the following regression equation:

$$\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\,\beta_1 + X'_{ct}\,\beta_2 + \epsilon_{ict} \tag{2.1}$$

Here, Rightwing_{ict} is the vote share of right-wing parties in district i in county c in election t. In light of the discussion above, I consider the combined votes for the conservative Right and Nationalist parties as constituting the "right-wing" vote share in this particular setting. In an attempt to address potential problems of omitted variables, I include district fixed effects γ_i to account for time-invariant district-specific voting behaviour and time fixed effects η_t to account for changes in political sentiment over time affecting all districts identically. Finally, in most specifications I include district-level controls X_{ict} and county-level controls X_{ct}. Such controls will be of especial importance in dispelling concerns about the potentially confounding effects of immigration and of the Great Depression.

The key variable in equation 2.1 is the interaction $\text{Post}_t \times \text{Swedish}_i$. Post_t is an indicator equal to 1 if an election took place after 1927,[5] and Swedish_i is an indicator equal to 1 if an election district is in a region of above-median "Swedishness" according to the cephalic index measurement in Linders and Lundborg's anthropometric study (Linders and Lundborg, 1926). Thus, the coefficient δ should be thought of as the effect of the increased salience of "Swedishness" in particularly "Swedish" districts on right-wing voting behaviour. If the key parallel trends assumption holds, and there are no confounding changes at the same time as the propaganda treatment, this effect can be said to be causal.

For a first impression of the relationship in question, I plot the spatial distributions of three key variables in Figure 2.5. In Panel A, I show the distribution of the measured cephalic index in Linders and Lundborg's anthropometric study (Linders and Lundborg, 1926). In Panel B, I show how this translates to the $Swedish_i$ indicator used in equation 2.1. Finally, in Panel C, I show the election districts which exhibited an increase in the average vote share of right-wing parties from the pre- to the post-publication period. Broadly, it can be seen that districts with a higher level of "Swedishness" are more likely to have seen an increase in right-wing vote

[5] That is, after the publication of the popular text, *Svensk Raskunskap*.

shares in the interwar period. To formally investigate this spatial pattern, I employ the differences-in-differences strategy outlined above.

Randomness of "Swedishness"

Before proceeding with the estimation of equation 2.1, I establish that assignment to treatment (that is, a district's identification as being of above-median "Swedishness") is plausibly random conditional on observables. In Figure 2.6, I plot the residuals of a regression of the main "Swedishness" measure, the cephalic index of a district, on a number of observables as well as county fixed-effects against the district's right-wing vote share in 1917.[6] As is evident from the figure, there is no systematic relationship between the measured "Swedishness" of a district not accounted for by observables and that district's support for the right wing in the first election of my sample period. This gives me confidence that "Swedishness", and hence assignment to treatment, is as good as random once controlling for these observables.

2.4.1 The Effect on Right Wing Parties

To quantify the political impact of the publication, I report in Table 2.2 the coefficients of various specifications of regression equation 2.1.[7] Column 1 reports the coefficient δ from the basic specification with district and time fixed effects only. The coefficient is positive and significant at the 1 percent level, and should be interpreted as follows: on average, right-wing parties receive 3.6 percentage points more of the vote share in above-median "Swedish" districts than in below-median districts following the *Institute's* propaganda campaign. Column 2 generalises the difference-in-differences framework, and allows the "Swedishness" effect to vary by year.

[6] Observables include urban status, industrial status, population, average wealth and average income.

[7] Robust standard errors clustered by treatment region are reported in parentheses below each coefficient.

The remaining columns of Table 2.2 introduce controls into the regression. Columns 3 and 4 include basic controls, such as the number of male inhabitants of the district as well as the population density of the county.[8] Columns 5 and 6 introduce time-interactions of cross-sectional characteristics to address concerns that the "Swedishness" measure is simply picking up these characteristics.[9] The estimated effect is very consistent across all specifications. Finally, in Figure 2.7, I plot the coefficients from column 6 to demonstrate that the crucial parallel trends assumption holds. There is no "Swedishness" effect prior to treatment, and a growing effect in the elections following the publication of the text.

An effect which materialises slowly over the elections following the inception of the *Institute's* propaganda campaign is expected for three main reasons. First, a gradual incorporation of racial elements into political parties' manifestos would result in a lagged matching between racial ideas and their representation in parliamentary politics. Second, even with the development of mass media, the diffusion of new ideas could not be instantaneous. Third, given that the *Institute's* popular text was intended for use in schools, its political effect could only manifest itself in electoral outcomes when students were eligible to vote.

Having shown that right-wing parties received a relatively larger vote share in "Swedish" districts as a result of the propaganda campaign, an important corollary is whether this resulted in increased political power locally. To answer this question, I estimate the same specifications of equation 2.1 with an indicator equal to one if the right-wing parties of a district constitute the largest political block. The results of this exercise are reported in Table 2.3, and strongly suggest that the increased vote share was accompanied by greater political weight locally. Columns 1, 3 and 5 show that right-wing parties are around 8.5 percent more likely to be the dominant block in "Swedish" districts following the publication of the book. Similarly to the

[8] I use the number of male inhabitants because this information is available for all elections, whereas the total number of inhabitants is only available for the elections from 1921 onwards.

[9] These characteristics include an indicator for urban districts, an indicator for industrial districts, income p.c. and wealth p.c. as measured pre-treatment.

slowly materialising effect on vote shares, columns 2, 4 and 6 document a similar gradual effect for local political power. To visually represent the effect, I plot the coefficients from column 6 in Figure 2.8.

Robustness to potential confounders

The difference-in-differences strategy relies on the assumption that there are no changes at the same time as the propaganda treatment which could confound the estimated effect. In this subsection, I dispel such concerns about some key potential confounders. The results from this exercise are reported in Table 2.10 in the Appendix. Column 1 restates the baseline result for vote shares from above, and the subsequent columns deal with each potential confounder in turn.

In column 2, I introduce turnout as a control. If the upswing in right-wing support comes from the activation of previously non-participating parts of the electorate, then this would alter the interpretation of my results. Reassuringly, the inclusion of turnout as a control variable leaves the estimated coefficient virtually unchanged.

The two key potential confounders in this period are the Great Depression and the migration flows of the interwar period. Both of these events were politically salient, and if treatment and control districts were differentially affected by either event, this may well have translated into differential electoral outcomes. Figure 2.17 in the Appendix plots the evolution of these potential confounders. I can address separately two types of immigration flows: the number of "outsider" immigrants[10] per 1,000 inhabitants as well as the number of working immigrants per 1,000 inhabitants. To address the effect of the Great Depression, I have county-level data on poverty (as measured by the number of people in poorhouses per 1,000 inhabitants) and on unemployment (as measured by the number of jobseekers per 1,000 inhabitants). As reported in columns 3 to 6, the inclusion of these controls does not

[10]Those from outside of the Nordic countries, Western Europe and the Anglo-Saxon offshoots.

substantially alter the estimated coefficient δ, which should alleviate concerns that my effect is confounded by these aspects of the interwar political climate. Finally, column 7 includes all these controls, and the "Swedishness" effect is robust to their simultaneous inclusion.

Robustness to other measures of "Swedishness"

The division of districts into treatment and control based on a median split according to their cephalic index is desirable for two reasons. First, the cephalic index was the dimension of "Swedishness" which the *Institute* emphasised most strongly in its work, as evidenced by the anthropometric study (Linders and Lundborg, 1926) and its popular version (Lundborg, 1927). Second, the use of an indicator variable for treatment yields more easily interpretable coefficients.

This is not to suggest that the estimated effect is unique to the chosen definition of the treatment variable. In Table 2.11 in the Appendix, I report additional specifications of equation 2.1 where the treatment variable $Swedish_i$ has been replaced with alternate measures of "Swedishness". Column 1 reproduces the coefficient from the baseline specification. In column 2, I use the standardised cephalic index of district i directly: a continuous treatment variable rather than an indicator. As explained above, a low cephalic index corresponds to the longer skulls (*dolichocephalic*) thought to be more "Swedish". In my standardised measure I account for this, such that a large number for the standardised cephalic index should be thought of as more "Swedish". The coefficient reported in column 2 tells the same story as the baseline specification: more "Swedish" regions became more right-wing following the start of the propaganda campaign.

In column 3, I introduce a different measures of "Swedishness" altogether: a standardised continuous morphological index.[11] Again, the standardisation is such that a high index is associated with a higher degree of "Swedishness". The estimated

[11] Similar to the cephalic index, which captures the dimensions of the skull, the morphological index captures the dimensions of the face.

effect is significant and in a direction consistent with the previous findings: more "Swedish" regions became more right-wing.

Finally, I explore some of the non-linearities of the "Swedishness" effect in column 4. Rather than a median split, I report results from a quartile split according to the cephalic index, with the bottom quartile as the reference category. The estimates show that the "Swedishness" effect is driven entirely by the top quartile.

Robustness to land and employment shares

A potential concern with the specifications used so far is that political developments depend on the structure of the economy in complex ways. Hence, it may not be sufficient to control for the potentially differential trends in support for right-wing parties simply by including time interactions with indiciators for whether a district is rural or non-rural, industrial or non-industrial, and so on. To capture local economic structure more granularly, I construct land and employment shares for each district using agriculture and employment censuses.[12] Interacting these shares with election fixed effects will allow me to more accurately pick up the political effect of economic structure over time.

I report the result of these robustness checks in Table 2.12 in the Appendix. Column 1 reports the baseline result. Columns 2 and 3 include controls for the share of agriculture in the economy, measured either as the share of land used for agriculture or as the share of employment in agriculture. Agricultural regions could be more socially conservative and therefore become more right-wing during the interwar period. This may confound the estimated "Swedishness" effect if "Swedish" districts are those which are predominantly agricultural. Reassuringly, the effect is stable to the inclusion of these share-time interactions.

Column 4 includes similar interactions for the share of employment in industry, and the estimated "Swedishness" effect is virtually unchanged. In column

[12] I use the censuses conducted most closely prior to the publication of the book: the agricultural census of 1927 and the employment census of 1920.

5, I conduct the same exercise for the share of employment in trade. This is an important consideration, as districts reliant on trade may be more metropolitan and therefore respond negatively to the fundamentally exclusionary rhetoric of the *Institute*. The estimated effect, however, is robust to the inclusion of these interactions. Finally, in column 6 I include all employment share interactions simultaneously, and the coefficient estimate remains unchanged.

Robustness to various fixed effect specifications and potential outliers

As a final check of the robustness of the main results, I investigate the extent to which they are sensitive to differential developments on the county level.[13] One way to conduct this check is to re-estimate the main specification 25 times, leaving each county out in turn. If the estimated effects in each of the restricted regressions are similar to the effect in the unrestricted regression, it is likely that no one county is driving the result. I report the results of this exercise in Figure 2.18 in the Appendix. The effect is very stable across the different restricted regressions, so it seems unlikely that the result is peculiar to any one outlying county.

A similar, more stringent way of testing whether unobserved county-specific characteristics are driving the results is to include richer fixed effects in the main regression equation. I report results from such specifications in Table 2.13 in the Appendix. Columns 1 and 2 report the baseline results from above, excluding and including district-level cross-sectional characteristics interacted with election fixed effects. Columns 3 and 4 augment this specification by including county-specific time-trends, which allow the right-wing vote shares in each of the 25 counties to follow differential linear trends in the interwar period. The estimated "Swedishness" effect is attenuated slightly, but remains positive and significant. Finally, in columns 5 and 6 I report even more restrictive specifications including county-by-year fixed

[13] Counties are one level of administration above the district. There were 25 counties in Sweden in the interwar period (24 counties in the full sense plus Stockholm city, which I consider a separate county for the purposes of these checks).

effects. This allows each county's right-wing vote share to vary flexibly from year to year. Even here, there is a positive and significant effect, which gives me confidence that the result is not driven by unobservable yearly variation on the county level.

2.4.2 The Effect on Other Parties

Given that more "Swedish" districts became more right-wing following the publication of the book, which parties were on the losing end? That is, which parties' vote shares did the right wing usurp in these districts? In Figure 2.9, I plot the evolution of the other parties' vote shares over time, and in Table 2.4 I report the coefficient on the $\text{Post}_t \times \text{Swedish}_i$ interaction with different parties' vote shares as the dependent variable in specification (2.1). From these coefficients, it appears that the chief losers were the Farmers, but this effect is driven by a large positive difference in 1920. There is no significant negative "Swedishness" effect in any of the elections post-1927. For other parties, such as the Liberals, Social Democrats or Left parties, there was no significant effect.

The rise of the right wing at the expense of the Farmers can be rationalised with an eye on Lindström's thesis on the interwar political manoeuvrings (Lindström, 1985). While the Farmers had exhibited traditional national-romanticism with a mixture of "racism, chauvinism, and xenophobia" in the early twentieth century, by the 1930s their politics had taken on a more social democratic flavour. This *rapprochement* was best demonstrated by the 1933 crisis agreement between the Farmers' League and the Social Democratic Party, which was struck primarily in response to the Great Depression, but also as a bulwark against the rise of National Socialism (notably, the agreement coincided with the Nazi seizure of power in Germany (Möller, 2015)).

If the publication of the book inspired concerns about racial purity, then the Farmers decreasingly represented an answer to that quandary. Rather, it was the National Socialists (explicitly) and the Right Party (increasingly flirtatiously) who embraced the rhetoric of race biology. Such (re-)positioning on the issue of race can go some way toward explaining why the right wing was able to grow at the expense of the Farmers in particularly "Swedish" districts.

2.4.3 Heterogeneity of the Effect

To unpack the mechanisms of the effect presented above, I conduct a heterogeneity analysis to identify the types of districts driving the "Swedishness" effect. These results are reported in Table 2.5. The dimensions of heterogeneity I consider are: urban versus rural districts, industrial versus non-industrial districts, high- versus low-immigration districts. The columns of Table 2.5 present these in turn.

Column 1 restates the baseline result. Columns 2 and 3 present the heterogeneity of the effect along urban/rural and industrial/non-industrial divides.[14] It could be expected that urban and rural districts respond differently to the propaganda treatment. To the extent that the industrial/non-industrial distinction captures differences in class structure, we may also expect to observe differential responses between these two types of districts. From the reported coefficients, however, it is apparent that the "Swedishness" effect does not significantly differ along these dimensions.

The striking result in Table 2.5 is reported in column 4. Here, I allow the effect to differ according to levels of pre-treatment immigration. The coefficients suggest that the result is driven entirely by those districts which experienced low levels of immigration, which suggests that insular communities may be especially susceptible to the type of 'us and them' rhetoric embodied in the *Institute's* propaganda campaign. This result speaks to the concept of "defended neighbourhoods" in the political science literature, which holds that "outsider" groups will only be perceived as threats in local areas where such groups were initially absent (Newman, 2013). The "contact hypothesis" provides a different lens through which to

[14] Note that the respective post$\times$urban and post$\times$industrial coefficients will be subsumed in the time $\times$ cross-sectional characteristics controls, so they are not reported.

view my results: mutual exposure between groups can attenuate conflict.[15] In this sense, election districts which had seen little immigration before the propaganda intervention were defended neighbourhoods with little contact with the "outsider" group, which appears to have magnified the impact of the *Institute's* propaganda.

2.4.4 The Library Effect

The analysis so far has used the publication of the race-biological text only to identify the crucial moment when the popularisation of race biology began. Ideally, I would like to observe exactly where each copy of the book was sent to identify the effect of the book in a very narrow sense. Unfortunately, neither the *Institute* nor the publisher of the book appear to have kept detailed records of purchases, which renders the ideal analysis infeasible. Nevertheless, it is important to determine whether the book was important *per se*, or whether it should be thought of more widely as an embodiment of the wider popularisation of race biology.

To shed light on this distinction, I collect data on state funding of libraries in 1926 (the year before treatment). These data provide both a very comprehensive list of the libraries throughout Sweden (each entry states the municipality in which the library is located) and an indication of their relative sizes (libraries received different levels of state funding). I aggregate the library funding data on the level of the election district, and classify districts as having high or low library funding by way of a median split. The nature of the data allows me to perform this split for total library funding and separately for people's (public) libraries and school libraries. I interpret high library funding as indicative of the accessibility of the race-biological book. Libraries with higher funding were *ceteris paribus* more well-stocked, and therefore more likely to stock the text. If the "Swedishness" effect is stronger in regions with better library funding, then this is suggestive of an effect associated with the text itself.

[15] Steinmayr explores this hypothesis in the Austrian context, where a neighbourhood's exposure to refugees decreases support for the far right (Steinmayr, 2016).

In Table 2.6, I report estimations of the main regression equation which incorporate the library data. Column 1 restates the baseline result. Column 2 introduces a triple interaction to investigate whether the "Swedishness" effect is stronger in election districts with well-funded libraries. The results suggest that the effect is driven by districts with high library funding: the triple interaction $Post \times Swedish \times High\, library\, funding$ is significant, while the double interaction Post × Swedish is smaller and insignificant. Columns 3 and 4 introduce similar triple interactions, considering people's library and school library funding separately. The results in these columns suggest that school libraries played a crucial role in the efficacy of the propaganda campaign. This is consistent with the notion that information treatments are more effective when the recipient is at a young age. To the extent that students discuss their schooling with parents and relatives, this result is also suggestive of a transmission mechanism by which information is diffused within the household and the propaganda effect magnified.[16]

2.4.5 Exposure to Race-Biological Media

Besides the direct consumption of race-biological ideas as embodied by the book, a different channel by which racial attitudes may have proliferated is via the exposure to media covering these topics. In order to investigate this channel, I collect data on the coverage of race biology in national and local newspapers. The *Institute* kept a rich collection of clippings from newspapers covering its work as well as race biology more broadly: the collection spans the years 1907-1935 and contains 1762 articles from 301 different newspapers. I use this collection to construct a measure of exposure to race-biological media and investigate how this interacted with the "Swedishness" effect documented above.

For each of the 301 newspapers, I identify the location of its headquarters and assign each of the newspaper's articles to the corresponding election district.

[16] See Becker et al. (2017) for an exploration of this transmission mechanism in the context of education in Germany's secularisation period.

Since newspapers have a readership extending beyond its immediate election district, I construct a distance-weighted index of exposure which takes on large values for election districts that are near election districts producing many race-biological newspaper articles:

$$\text{Exposure}_i = \sum_j \frac{n_j}{ln(e + D_{ij})}$$

Here, n_j is the number of race-biological newspaper articles published in district j in the period 1907-1935, D_{ij} is the distance in kilometres between the centroids of districts i and j. D_{ii} is normalised to zero, which yields the property that an election district's own articles are unweighted, and articles from other districts are distance-weighted.

In Figure 2.10, I plot the spatial distribution of media exposure. The media dominance of Stockholm is clear from the map, but also the media hubs of Gothenburg and Malmö as well as local newspapers from smaller towns impact the index and create local variation in media exposure.

I incorporate this information on newspapers in my analysis to explore the role of media exposure in driving the "Swedishness" effect. Results from this exercise are reported in Table 2.7. In columns 1 and 2, I first check whether there is a "Swedishness" effect in determining contemporaneous or cumulative media exposure. In these columns, I simply use media exposure as the dependent variable in equation 2.1. Neither coefficient of interest is significant, suggesting that that there is no systematic increase in newspaper exposure to race-biological topics in particularly "Swedish" regions following the publication of the book.

Rather than thinking of media exposure as an outcome of the propaganda, it should be viewed as its moderator. I explore this interpretation in columns 3 to 5. Column 3 restates the baseline result from previous sections. Column 4 reports the media effect in isolation: the coefficient on $Post \times Media$ is the impact on right-wing vote shares following the start of the propaganda campaign in districts with above-median media exposure. This impact is positive and significant, suggesting that media exposure may be an important channel for the "Swedishness" effect.

In column 5 I explore this channel directly by interacting high media exposure with high "Swedishness". The results of this exercise suggest that media indeed is an important moderator. Districts of high "Swedishness" vote significantly more for the right wing following the publication of the propagandistic book only in districts of above-median media exposure. Media appears to have a central role in shaping the spread of and response to radical ideas by granting the prerequisite step of exposure to these ideas.

2.5 The Correspondence of the Institute

To supplement the above evidence for a turn to the right in above-median "Swedish" districts following the publication of the book, I construct a district-level panel of direct correspondence with the *Institute*. Direct correspondence is a less noisy measure of support for the racial paradigm. No political party made race biology their sole issue and, as such, voting for a party which promotes such ideas is suggestive but not conclusive. Writing a letter, however, demonstrates more unambiguously a willingness to engage with the ideas of the *Institute*.

In the construction of the panel, I make use of the complete registries of the incoming correspondence of the *Institute*. For each calendar year, the *Institute* kept files of every incoming letter, including its subject and the location of the writer. See Figure 2.19 in the Appendix for an example of the registries used. I use this information to categorise each letter by subject and assign it to the election district from which it was sent. Three categories in particular will be of interest: letters concerning (i) the books of the *Institute*, (ii) race-biological literature more generally, and (iii) photographs. Photographs are of interest because of the inherently visual element of Swedish race biology (Kjellman, 2013). People would write to the *Institute* to request loans of photographs from the *Institute's* large collection (primarily for the purposes of education), but also to submit private photographs of "racial archetypes". The resulting panel covers the same districts as the analysis of electoral outcomes, and spans the years 1925 to 1934. This results in a total of ten years and 383 districts.

Panel E of Table 2.1 provides descriptive statistics, and Figure 2.20 in the Appendix plots the number of incoming letters over time by category. There are pronounced spikes in letters about books and literature in 1927, in part due to the large numbers of letters requesting a copy of the *Institute's* books which were published that year. Of further note is the growth in the volume of letters about photographs, particularly in treatment districts (districts of above-median "Swedishness").

To estimate this effect more formally, I will once again employ a differences-in-differences framework and estimate the following regression equation:

$$\text{Letters p.c.}_{ict} = \gamma_i + \eta_t + \psi \, \text{Post}_t \times \text{Swedish}_i + X'_{ict} \, \beta_1 + X'_{ct} \, \beta_2 + \nu_{ict} \qquad (2.2)$$

Here, Letters p.c.$_{ict}$ measures the number of letters sent to the *Institute* per 1,000 inhabitants of a district.

The results are reported in Table 2.8. Column 1 reports the "Swedishness" effect on total per capita correspondence, while columns 2 to 4 split correspondence into the three categories discussed above. The results are very consistent across correspondence categories: more "Swedish" districts become more directly involved with the *Institute*. I present the results from generalised difference-in-difference regressions in Figure 2.11. Importantly, the parallel trends assumption is satisfied.

The increased willingness to interact directly with the *Institute* in particularly "Swedish" regions provides corroborative evidence for the argument that they became more open to race-biological ideas after 1927. The results on letters sent enquiring about race-biological literature and the *Institute's* own publications especially strengthen the claim. Less strong conclusions can be drawn from the results on letters about photographs. While the coefficients are positive, they are statistically insignificant. This may be a symptom of the relatively small number of letters sent regarding photographs, which makes it difficult to detect effects. Alternatively, there may simply be no systematic effect of "Swedishness" on this category of correspondence. To the extent that the *Institute* welcomed submissions of photographs of both "Swedish" and "non-Swedish" archetypes, it is not surprising to see letters from both types of districts.

On the whole, however, the analysis of the *Institute's* correspondence supports the main line of argument that more "Swedish" regions became more accepting of a race-biological paradigm as a result of the propaganda campaign.

2.6 The Long Run: Swedish Right-Wing Parties Today

A large literature in economics highlights the persistence of cultural phenomena over time and space. These enduring traits manifest themselves not least in political preferences and electoral outcomes.[17] Similar types of persistence are evident also in the Swedish case. In the popular imagination, Swedish racism never was a problem or at the very least was rendered obsolete in the post-war period. The work of Hélene Lööw, however, documents the enduring undercurrents of racial ideology present in Swedish society throughout the last half-century, as well as its recent resurfacing in the political arena (Lööw, 2000, 2004, 2015).

The most high-profile manifestation of this phenomenon is the rise to prominence of the Sweden Democrats (*Sverigedemokraterna*, henceforth SD). Formed in 1988, the party has its roots in the anti-immigration campaign group *Bevara Sverige*

[17] Some key examples are Voigtländer and Voth (2012) and Ochsner and Roesel (2017). More immediate, intergenerational transfer of preferences is documented in Avdeenko and Siedler (2017).

Svenskt (Keep Sweden Swedish), and its early politics were dominated by nationalist and racist sentiments (Möller, 2015; Widfeldt, 2014). Since its early days, the party has metamorphosed into a self-proclaimed "centrist" party and has moved toward the political mainstream, but its right-wing, anti-immigration rhetoric remains a defining feature. In Figure 2.21 in the Appendix, I reproduce a SD election poster which encapsulates this rebranding of old sentiments. The poster states "less immigration here, more help to refugees there", and the slogan of SD reads "security and tradition". The presentation is a far cry from the party's roots, but the content is similar.

In light of the thesis of persistence of culture and values as well as of the political "Swedishness" effect of the *Institute's* work documented above, it seems plausible that the recent election successes of the SD - the party received 12.9 percent of the popular vote in the 2014 general election - may be explained at least in part by artefacts of racial and nationalist thought from before the Second World War. If particularly "Swedish" districts turned to the right and embraced racial rhetoric in 1927, these ideas may have persisted locally over time in some form or other.

To investigate this possibility, I estimate a "long" differences-in-differences regression. In effect, I estimate equation 2.1 from above, but rather than restrict myself to the right-wing parties of the interwar period, I also include SD as a right-wing party in the present. I harmonise the spatial units by assigning historical election districts to present day municipalities, which results in 210 "municipalities" which exist over the entire 100-year period. I keep all the elections from the above analysis, and add the five elections in which data on SD's performance are available (1998, 2002, 2006, 2010 and 2014), for a total of 13 elections.[18] Concretely, I estimate the following differences-in-differences specification:

[18] Present-day election data are from Statistics Sweden's election statistics.

$$\text{Rightwing}_{mt} = \theta_m + \psi_t + \rho\,\text{Post}_t \times \text{Swedish}_m + X'_{mt}\,\alpha + \upsilon_{mt} \tag{2.3}$$

As discussed, Rightwing_{mt} is the sum of Conservative Right and National Socialist vote shares in the elections in the period 1917-1940, and the vote share of the Sweden Democrats in the elections in the period 1998-2014. I include municipality and election fixed effects, θ_m and ψ_t, as well as municipality-level controls X_{mt}. The coefficient of interest is ρ, which is the political impact of the publication of the book in the extended post-treatment period. Some specifications will allow ρ to differ between the interwar post-treatment period (1928-1940) and the modern post-treatment period (1998-2014), and some specifications allow for a fully flexible effect over time.

Importantly, because I am comparing vote shares for two different political entities at different points in time, I standardise the right-wing vote share variable separately for the interwar period and the modern period. While the election fixed effects will take care of level shifts in right-wing vote shares over time, they will not capture potential differences in the higher-order moments of their distribution. In particular, standardising separately for the interwar and modern periods accounts for differences in the variance of vote shares in the two periods.

I report the results from the estimation of equation 2.3 in Table 2.9. The results carry over very consistently from the analysis of the interwar period alone. Column 1 reports a positive and significant 'Swedishness" effect for the combined post-treatment period: above-median "Swedishness" regions exhibit a 0.43 standard deviation increase in right-wing vote shares following the propaganda treatment. The effect is in fact larger in magnitude in the modern period, as shown in column 2. Columns 3 and 4 add a further interaction with a low-immigration indicator. The results from above carry through strongly: the "Swedishness" effect is driven by those regions which had been exposed to little immigration prior to the propaganda intervention.

In Figure 2.12, I report the coefficients from a more generalised differences-in-differences specification, where I allow the treatment effect to vary by year. It is evident that the effect which materialised in the 1930s still persists to the present-day elections. This suggests that interventions such as the *Institute's* propaganda campaign can have effects that persist locally over time. Viewed together with the existing literature on cultural persistence, it is plausible to suggest that if such a campaign was successful in the short run, then, to the extent that it influences people's worldview, this worldview could be passed down locally through generations and manifest itself in voting for right-wing parties in the present. The fact that the effects are driven by regions which had experienced little immigration prior to the propaganda intervention suggests that the entrenchment of concepts of 'us and them' is particularly strong in settings where 'us' is insulated from 'them'.

2.7 Concluding Remarks

In this chapter, I have shown how the Swedish *State Institute for Race Biology* was instrumental in the formation of racial paradigms in the early part of the twentieth century and how this historical shift carries a legacy to the present day. The publication of a popular race-biological propaganda piece classifying the Swedish population according to racial "purity" achieved its aim of making race more politically salient. Following the publication of the propagandistic text, election districts deemed particularly "Swedish" according to the *Institute's* measures exhibited a relative increase in the vote shares of the right-wing parties embracing its racial ideas. This effect is particularly strong in districts with relatively good levels of library funding, suggesting that access to the text was indeed crucial. Additionally, newspaper coverage of race-biological ideas appears to have been key in mediating the effect. Heterogeneity analyses show that the effect was driven by district with low levels of pre-treatment immigration, which suggests that "defended neighbourhoods" respond particularly strongly to the increased salience of the threat of the "outsider". Using registries of correspondence, I have presented evidence that support for race-biological paradigms manifests itself not only in support for the right wing, but also in direct interaction with the *Institute*. Finally, I have shown that the impact of the propaganda campaign is persistent, with support for the Sweden Democrats (a right-wing populist party) exhibiting a positive "Swedishness" effect in recent elections.

My work sheds light on the potency of propaganda campaigns in shaping preferences, particularly when such campaigns speak directly to identity. Racially-based propaganda resonates with concepts of 'us and them', particularly in regions where mutual inter-group exposure is low. The resulting entrenchment of racial worldviews has the potential to be highly persistent. If we seek to understand the current resurfacing of radical racial rhetoric as well as its milder expressions in present political discourse, it is crucial to appreciate the deep-rootedness of such worldviews.

2.8 Tables

Table 2.1: Summary statistics

	Mean	Std. Dev.	Min.	Max.
A. Election Variables				
Right	0.254	0.146	0	1
Farmers	0.142	0.138	0	0.871
Liberals	0.182	0.118	0	0.768
Social Democrats	0.357	0.167	0	0.787
Left	0.059	0.087	0	0.65
Nationalists	0.001	0.007	0	0.211
Others	0.001	0.005	0	0.063
Turnout	0.664	0.113	0.052	0.999
B. Race Variables				
Above-median “Swedishness”	0.499	0.5	0	1
Mean cephalic index	77.152	0.626	75.400	79.236
Variance of cephalic index	9.559	1.025	5.277	13.157
Mean morphological index	92.657	1.138	88.673	95.447
Proportion light eyes	0.862	0.054	0.487	0.939
In lowest ceph. ind. region	0.59	0.492	0	1
In most Nordic region	0.313	0.464	0	1
In region with Baltic influence	0.734	0.442	0	1

Note: Election variables are taken from various volumes of statistics produced by Statistics Sweden. *Right* is the vote share of the conservative right party. *Farmers* is the vote share of farmers' parties. *Liberals* is the vote share of traditional liberal parties. *Social Democrats* is the vote share of the social democratic party. *Left* is the vote share of far left parties. *Nationalists* is the vote share of various nationalist and Fascist parties. *Others* is the vote share of other parties. *Turnout* is the election turnout as proportion of eligible voters.
Race variables are constructed from Linders and Lundborg (1926) and Lundborg (1927). *Above-median "Swedishness"* = 1 if the mean cephalic index of a district is below the median of such indeces across all districts, 0 otherwise. *Cephalic index* is a measure of the proportions of the skull, with a low index indicative of higher "Swedishness". *Morphological index* is a measure of the proportions of the face, with a low index indicative of higher "Swedishness". *Proportion light eyes* is the proportion of surveyed conscripts of a region with light eyes. *In lowest ceph. ind. region* = 1 if in region with lowest cephalic index in Lundborg (1927), 0 otherwise. *In most Nordic region* = 1 if in highest class of "Nordic purity" in Lundborg (1927), 0 otherwise. *In region with Baltic influence* = 1 if not in region with lowest class of "Baltic influence" in Lundborg (1927), 0 otherwise.

Table 2.1: Summary statistics (continued)

	Mean	Std. Dev.	Min.	Max.
C. Control Variables				
District Level				
Male population (1,000)	4.194	7.985	0.124	185.466
Urban	0.329	0.47	0	1
Industrial	0.193	0.395	0	1
County Level				
Population density (per sq. km)	41.328	184.653	1.8	4307
Poor per 1,000	54.148	23.976	20.948	173.302
Total immigration per 1,000	0.992	0.603	0.226	4.005
Outsider immigration per 1,000	0.057	0.068	0	0.756
Working immigration per 1,000	0.431	0.295	0.073	1.683
Jobseekers per 1,000	99.525	78.092	5.307	429.476
D. Library Variables				
Library present	0.966	0.181	0	1
Library funding (total)	818.367	750.356	0	4765.53
Library funding (people's)	320.794	280.498	0	1643.33
Library funding (school)	497.572	526.060	0	3122.2
E. Correspondence Variables				
Ever sent letter	0.606	0.489	0	1
Total	0.552	4.341	0	136
Books	0.067	1.504	0	83
Literature	0.119	1.749	0	90
Photographs	0.060	0.551	0	21

Note: Control variables are constructed from various volumes of statistics produced by Statistics Sweden. *Male population* is the number of male inhabitants of a district, measured in thousands. *Urban* is an indicator = 1 if a district is urban. *Industrial* is an indicator = 1 if a district is industrial. *Population density* measures the number of inhabitants per square kilometre. *Poor per 1,000* is the number of individuals in poor houses per 1,000 inhabitants. *Total immigration per 1,000* is the total inflow of immigrants per 1,000 inhabitants. *Outsider immigration per 1,000* is the inflow of immigrants from outside the Nordic countries, Western Europe and the Western offshoots per 1,000 inhabitants. *Working immigration per 1,000* is the inflow of immigrants who take up work upon immigrating per 1,000 inhabitants. *Jobseekers per 1,000* is the number of people seeking work through government employment agencies per 1,000 inhabitants.
Library variables are digitised from Education Ministry records of library funding. *Library present* is an indicator = 1 if a district has a library. *Library funding (total)* is the total amount of funding received by libraries in a district. *Library funding (people's)* is the amount of funding received by people's (public) libraries in a district. *Library funding (school)* is the amount of funding received by school libraries in a district.
Correspondence variables are digitised from the *State Institute for Race Biology's* registries of correspondence. *Ever sent letter* is an indicator = 1 if a district ever sent a letter to the *Institute*. *Total* is the total number of letters sent by a district in a given year. *Books* is the number of letters regarding the *Institute's* publications sent by a district in a given year. *Literature* is the number of letters regarding race-biological literature sent by a district in a given year. *Photographs* is the number of letters regarding photographs sent by a district in a given year.

Table 2.2: Election results - effect on right wing parties: vote share

	Dependent variable: vote share of right wing parties					
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Swedish	0.0358***		0.0359***		0.0342***	
	(0.00979)		(0.00979)		(0.00908)	
1920 × Swedish		-0.0271		-0.0271		-0.0270
		(0.0205)		(0.0205)		(0.0174)
1921 × Swedish		-0.0180		-0.0180		-0.0166
		(0.0190)		(0.0190)		(0.0173)
1924 × Swedish		0.00637		0.00635		0.00722
		(0.0198)		(0.0198)		(0.0179)
1928 × Swedish		0.000156		0.000200		0.00153
		(0.0169)		(0.0169)		(0.0146)
1932 × Swedish		0.0299		0.0300		0.0283*
		(0.0194)		(0.0195)		(0.0160)
1936 × Swedish		0.0379*		0.0381*		0.0361**
		(0.0199)		(0.0200)		(0.0166)
1940 × Swedish		0.0365*		0.0366*		0.0346**
		(0.0194)		(0.0194)		(0.0173)
District fixed effects	Y	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y	Y
Basic controls	N	N	Y	Y	Y	Y
Election FE × cross-sectional chars.	N	N	N	N	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064	3,064
R-squared	0.381	0.390	0.381	0.390	0.440	0.448

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Year * Swedish = 1 if election year = year and if region is above-median "Swedish". Base election is 1917. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.3: Election results - effect on right wing parties: largest political group

	Dep. var.: indicator = 1 if right wing largest pol. group					
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Swedish	0.0879**		0.0881**		0.0855**	
	(0.0342)		(0.0342)		(0.0335)	
1920 × Swedish		0.0264		0.0262		0.0218
		(0.0612)		(0.0612)		(0.0537)
1921 × Swedish		0.0471		0.0474		0.0499
		(0.0576)		(0.0577)		(0.0556)
1924 × Swedish		0.0209		0.0215		0.0251
		(0.0593)		(0.0593)		(0.0566)
1928 × Swedish		0.0107		0.0112		0.0133
		(0.0578)		(0.0579)		(0.0539)
1932 × Swedish		0.114*		0.115**		0.109**
		(0.0578)		(0.0579)		(0.0527)
1936 × Swedish		0.166***		0.166***		0.164***
		(0.0533)		(0.0535)		(0.0534)
1940 × Swedish		0.155***		0.156***		0.153***
		(0.0542)		(0.0544)		(0.0543)
District fixed effects	Y	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y	Y
Basic controls	N	N	Y	Y	Y	Y
Election FE × cross-sectional chars.	N	N	N	N	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064	3,064
R-squared	0.174	0.180	0.175	0.180	0.220	0.225

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Year × Swedish = 1 if election year = year and if region is above-median "Swedish". Base election is 1917. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.4: Election results - other parties

	Dependent variable: vote share of									
	Right wing		Farmers		Liberals		Soc. Dem.		Far Left	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post × Swedish	0.0342***		-0.0252***		-0.00860		-0.000351		0.00519	
	(0.00908)		(0.00732)		(0.00827)		(0.0119)		(0.00745)	
1920 × Swedish		-0.0270		0.0413**		-0.00247		-0.0153		0.01000
		(0.0174)		(0.0163)		(0.00787)		(0.0100)		(0.00738)
1921 × Swedish		-0.0166		0.0157		0.00847		-0.0208*		0.0149
		(0.0173)		(0.0149)		(0.00898)		(0.0119)		(0.00947)
1924 × Swedish		0.00722		-0.00553		0.00740		-0.0168		0.0148
		(0.0179)		(0.0167)		(0.0106)		(0.0136)		(0.0112)
1928 × Swedish		0.00153		-0.00839		0.0159		-0.00703		0.0161
		(0.0146)		(0.0168)		(0.0133)		(0.0162)		(0.0120)
1932 × Swedish		0.0283*		-0.0176		-0.00887		-0.0151		0.0184
		(0.0160)		(0.0150)		(0.0119)		(0.0165)		(0.0122)
1936 × Swedish		0.0361**		-0.0132		-0.0162		-0.0154		0.0165
		(0.0166)		(0.0145)		(0.0141)		(0.0166)		(0.0125)
1940 × Swedish		0.0346**		-0.0101		-0.0118		-0.0167		0.00944
		(0.0173)		(0.0142)		(0.0142)		(0.0157)		(0.0122)
District fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064	3,064	3,064	3,064	3,064	3,064
R-squared	0.440	0.448	0.429	0.438	0.575	0.579	0.648	0.649	0.190	0.193

Note: Regressions of the form $\text{VoteShare}_{ict} = \gamma_i + \eta_t + \delta\ \text{Post}_t \times \text{Swedish}_i + X'_{ict}\ \beta_1 + X'_{ct}\ \beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Year × Swedish = 1 if election year = year and if region is above-median "Swedish". Base election is 1917. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.5: Election results - heterogeneity

	Dependent variable: vote share of right wing parties				
	(1)	(2)	(3)	(4)	(5)
Post × Swedish	0.0342***	0.0375***	0.0344***	0.0318***	-0.00869
	(0.00908)	(0.0124)	(0.0106)	(0.00897)	(0.0114)
Post × Swedish × urban		-0.00993			
		(0.0163)			
Post × Swedish × industrial			-0.000945		
			(0.0194)		
Post × low trade				-0.00333	
				(0.0140)	
Post × Swedish × low trade				0.00500	
				(0.0161)	
Post × low immigration					-0.00502
					(0.0143)
Post × Swedish × low immigration					0.0695***
					(0.0170)
District fixed effects	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064
R-squared	0.440	0.440	0.440	0.440	0.460

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\ \text{Post}_t \times \text{Swedish}_i + X'_{ict}\ \beta_1 + X'_{ct}\ \beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Urban = 1 if district is urban. Industrial = 1 if district is industrial. Low trade = 1 if district had below-median share of employment in trade pre-treatment. Low immigration = 1 if district had below-median levels of immigration pre-treatment. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.6: Election results - library effect

	Dep. var.: vote share of right wing parties			
	(1)	(2)	(3)	(4)
Post × Swedish	0.0342***	0.0196	0.0302**	0.0201*
	(0.00908)	(0.0127)	(0.0147)	(0.0106)
Post × High library funds		-0.00125		
		(0.0117)		
Post × Swedish × High lib. funds		0.0306**		
		(0.0152)		
Post × High lib. funds (people's lib.)			0.00725	
			(0.0123)	
Post × Swedish × High lib. funds (people's lib.)			0.00820	
			(0.0169)	
Post × High lib. funds (school lib.)				-0.00296
				(0.0127)
Post × Swedish × High lib. funds (school lib.)				0.0363**
				(0.0157)
District fixed effects	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064
R-squared	0.440	0.444	0.442	0.445

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\,\beta_1 + X'_{ct}\,\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post = 1 if year > 1927. Swedish = 1 if region above-median "Swedish". High library funds = 1 if district received above-median library funds pre-treament. High library funds (people's libraries) and High library funds (school libraries) are defined similarly. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.7: Election results - media effect

	Dependent variable:				
	Media (contemp.)	Media (cum.)	Vote sh. right wing part.		
	(1)	(2)	(3)	(4)	(5)
Post × Swedish	0.254	4.735	0.0342***		0.0178
	(0.240)	(4.373)	(0.00907)		(0.0141)
Post × Media				0.0133*	-0.0108
				(0.00792)	(0.0118)
Post × Swedish × Media					0.0309*
					(0.0163)
District fixed effects	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y	Y
Election FE × cross-sect. chars.	Y	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064
R-squared	0.983	0.987	0.440	0.430	0.443

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post = 1 if year > 1927. Swedish = 1 if region above-median "Swedish". Media = 1 if region received above-median cumulative media exposure by 1935. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.8: Correspondence results

	Dep. var.: p. c. corr. with the *Institute*			
	Total	Literature	*Institute's* books	Photographs
	(1)	(2)	(3)	(4)
Post × Swedish	0.0462**	0.0145*	0.0139**	0.00316
	(0.0222)	(0.00750)	(0.00645)	(0.00272)
District fixed effects	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y
Observations	3,830	3,830	3,830	3,830
R-squared	0.037	0.123	0.142	0.058

Note: Regressions of the form Letters $\text{p.c.}_{ict} = \gamma_i + \eta_t + \psi \, \text{Post}_t \times \text{Swedish}_i + X'_{ict}\,\beta_1 + X'_{ct}\,\beta_2 + \nu_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post = 1 if year > 1927. Swedish = 1 if region above-median "Swedish". Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.9: Election results - extended difference-in-differences results

	Dep. var.: stand. vote share of right wing parties			
	(1)	(2)	(3)	(4)
Post × Swedish	0.434***		-0.141	
	(0.119)		(0.155)	
Post (interwar) × Swedish		0.271***		-0.0146
		(0.0760)		(0.104)
Post (modern) × Swedish		0.569***		-0.248
		(0.165)		(0.214)
Post × low imm.			-0.0772	
			(0.165)	
Post × Swedish × low imm.			0.966***	
			(0.209)	
Post (interwar) × low imm.				0.0255
				(0.124)
Post (modern) × low imm.				-0.153
				(0.225)
Post (interwar) × Swedish × low imm.				0.454***
				(0.149)
Post (modern) × Swedish × low imm.				1.380***
				(0.285)
Municipality fixed effects	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y
Observations	2,728	2,728	2,728	2,728
R-squared	0.584	0.589	0.613	0.634

Note: Regressions of the form $\text{Rightwing}_{mt} = \theta_m + \psi_t + \rho\ \text{Post}_t \times \text{Swedish}_m + X'_{mt}\ \alpha + \upsilon_{mt}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post = 1 if year > 1927. Post (interwar) = 1 if year is between 1928 and 1940. Post (modern) = 1 if year is after 1940. Dependent variable is the vote share of right wing parties (Conservative Right and Nationalists in interwar period, Sweden Democrats in modern elections), standardised separately for the interwar and modern periods. Swedish = 1 if region above-median “Swedish”. Low immigration = 1 if district had below-median levels of immigration pre-treatment. Controls: population density, immigration per 1,000 inhabitants, percent unemployed, population, turnout. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions.

2.9 Figures

Figure 2.1: Excerpt from *Svensk Raskunskap*: map of “Nordic” archetypes

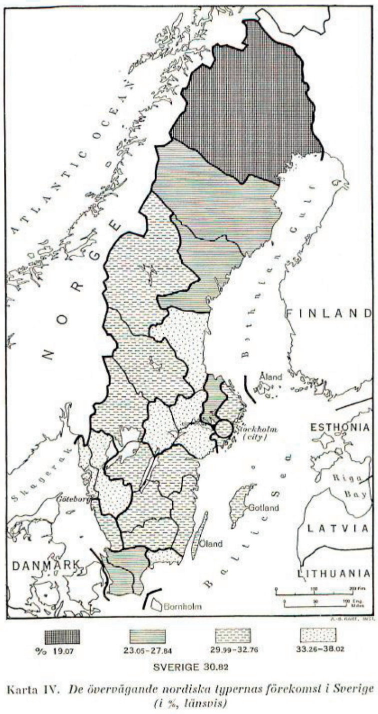


Figure 2.2: Excerpt from *Svensk Raskunskap*: “Nordic” archetypes

Figure 2.3: Excerpt from *Svensk Raskunskap*: “Baltic” archetypes

Figure 2.4: Elections, 1917-1940

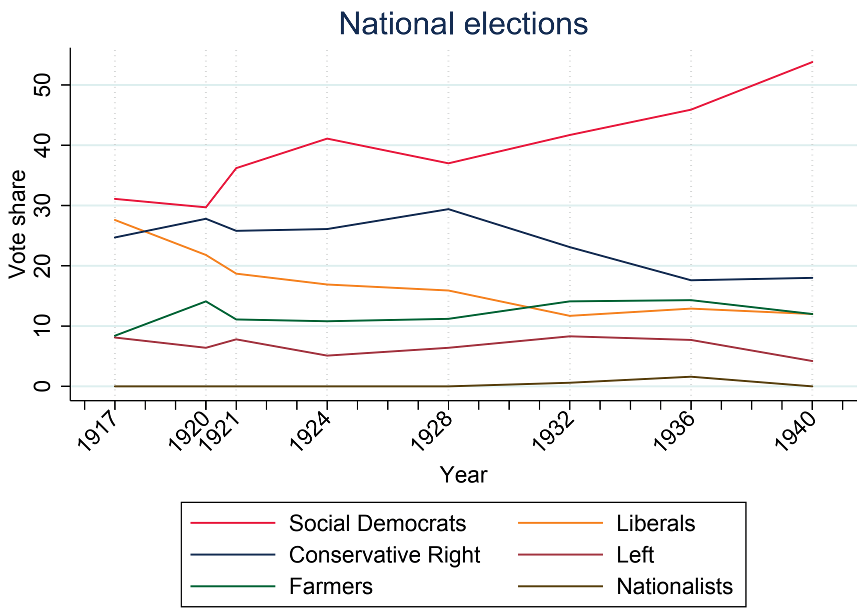
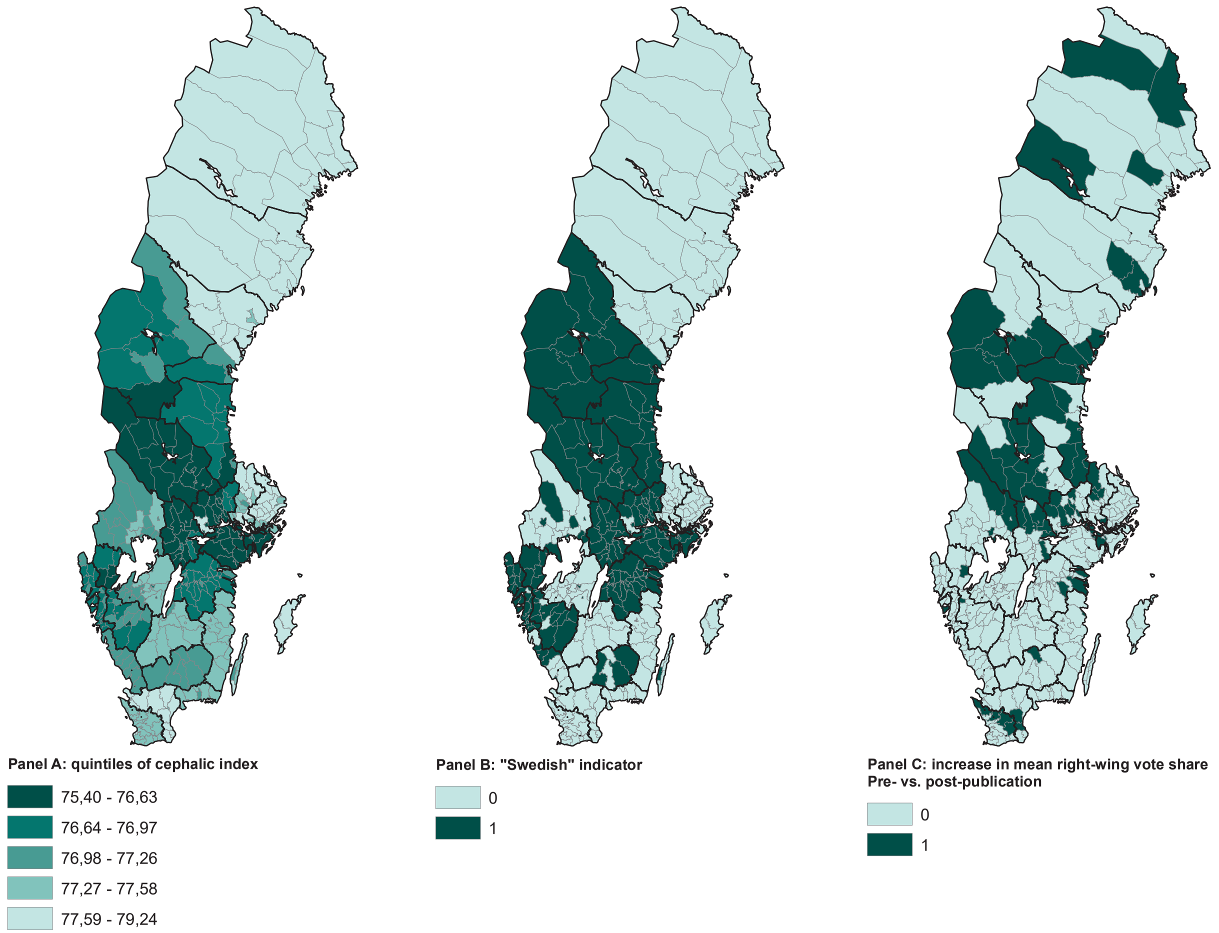


Figure 2.5: Spatial distribution of key variables



Note: Panel A: quintiles of cephalic index. **Panel B**: translation of cephalic index into "Swedish" indicator. **Panel C**: indicator for whether right-wing vote shares increased from the pre- to the post-publication period. Election district borders in light solid lines, county borders in bold solid lines.

Figure 2.6: Correlation between unexplained variation in cephalic index and right-wing vote share in 1917

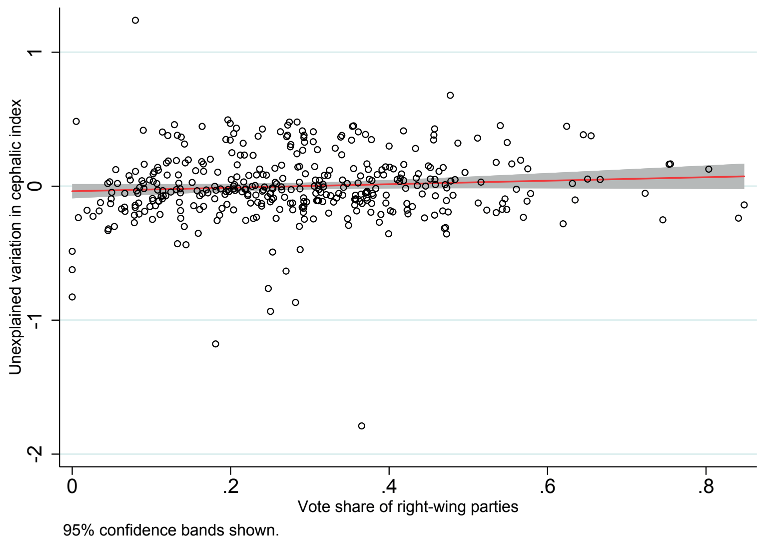
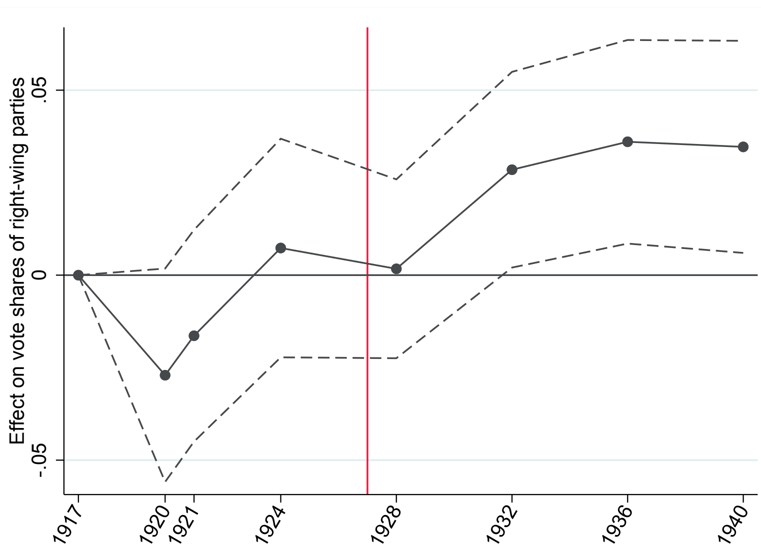
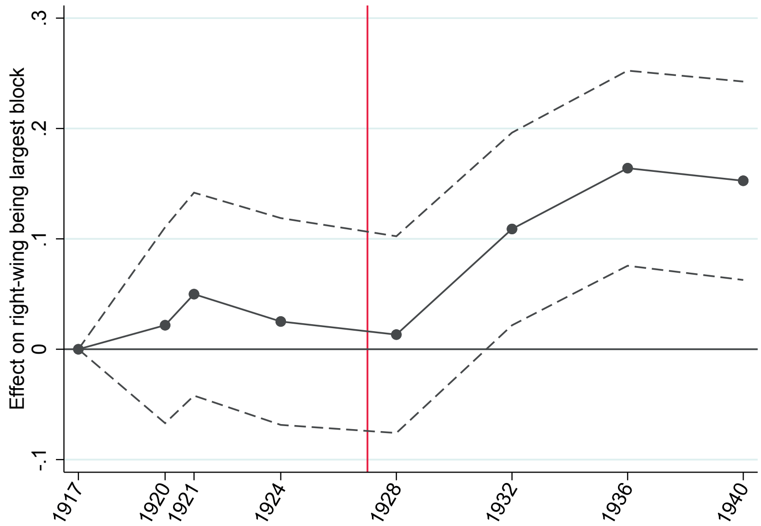


Figure 2.7: Effect on vote share over time, 1917-1940



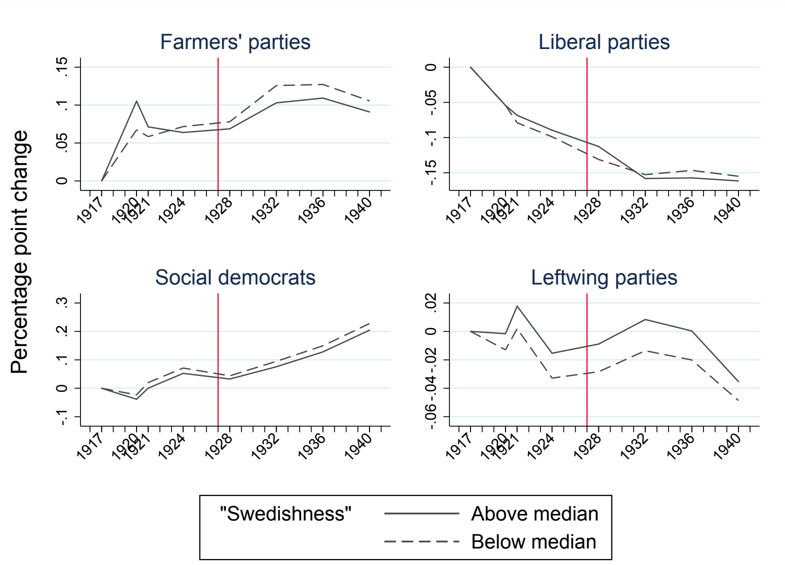
Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \sum_t \delta_t \, \text{Year}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. 1917 is the base election year. See text for details. 90% confidence intervals shown.

Figure 2.8: Effect on right wing as largest party over time, 1917-1940



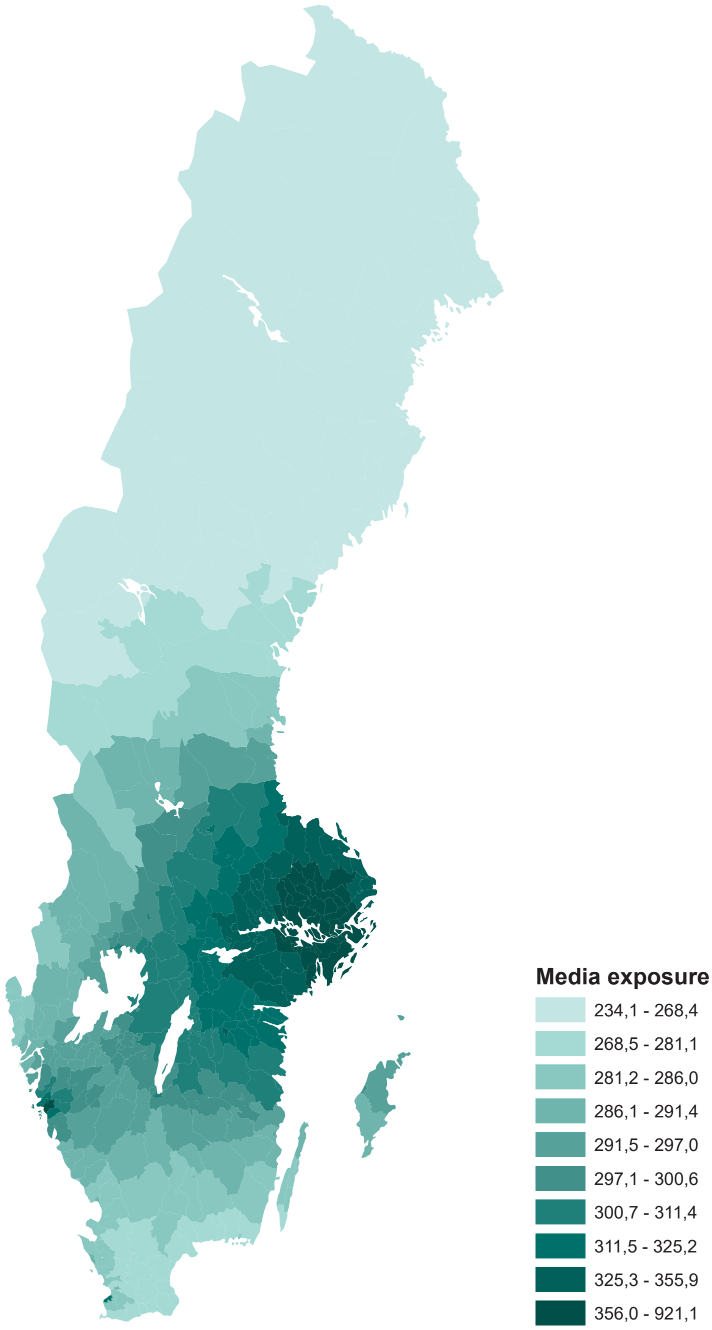
Note: Regressions of the form $\text{RightwingLargest}_{ict} = \gamma_i + \eta_t + \sum_t \delta_t \,\text{Year}_t \times \text{Swedish}_i + X'_{ict}\,\beta_1 + X'_{ct}\,\beta_2 + \epsilon_{ict}$. 1917 is the base election year. See text for details. 90% confidence intervals shown.

Figure 2.9: Other parties' vote share, 1917-1940



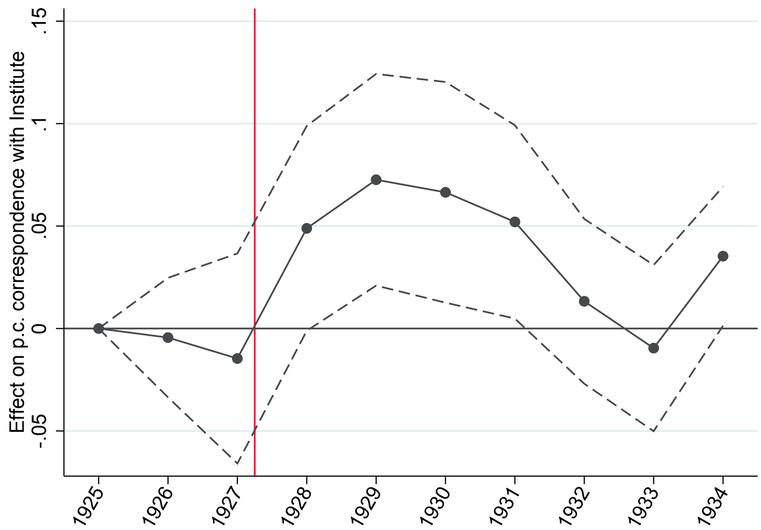
Note: Evolution of party shares normalised to 1917 levels.

Figure 2.10: Media exposure



Note: Exposure to race-biological media calculated according to the following formula: $\text{Exposure}_i = \sum_j \frac{n_j}{ln(e+D_{ij})}$, where n_j is the number of race-biological newspaper articles published in district j until 1935 and D_{ij} is the distance in kilometres between the centroids of districts i and j. D_{ii} is normalised to zero.

Figure 2.11: Effect on incoming correspondence, 1925-1934



Note: Regressions of the form Letters p.c.$_{ict} = \gamma_i + \eta_t + \sum_t \delta_t$ Year$_t$ $\times$ Swedish$_i + X'_{ict}\,\beta_1 + X'_{ct}\,\beta_2 + \epsilon_{ict}$. 1925 is the base year. See text for details. 90% confidence intervals shown.

Figure 2.12: The long run, 1917-2014

Note: Regressions of the form Rightwing$_{mt} = \theta_m + \psi_t + \sum_t \rho_t$ Year$_t \times$ Swedish$_m + X'_{mt}\,\alpha + \upsilon_{mt}$. 1925 is the base year. See text for details. 90% confidence intervals shown.

2.10 Appendix: Additional Tables and Figures

Figure 2.13: Newspaper clipping: *Göteborgs Morgonpost*, 26 November 1927.

Den nutida kulturen uppbäres till väsentlig del av den nordiska rasen.

En folkupplaga av Svensk raskunskap och vad den har att berätta.

Vad den nordiska rasen uträttat i världen.

Note: Headline: “Contemporary culture upheld to a significant degree by the Nordic race: A popular version of *Svensk Raskunskap* and its lessons”. Author’s translation.

Figure 2.14: Newspaper clipping: *Östersunds-Posten*, 29 November 1930.

De rashygieniska problemen kräva en snabb lösning.

Utredning om orsakerna till nativitetens minskning en statsuppgift.

Man måste känna anledningen till ett lidande för att kunna bekämpa det.

Dr E. Edlund.

Note: Headline: “The race-hygiene problems require a rapid solution.” Author’s translation.

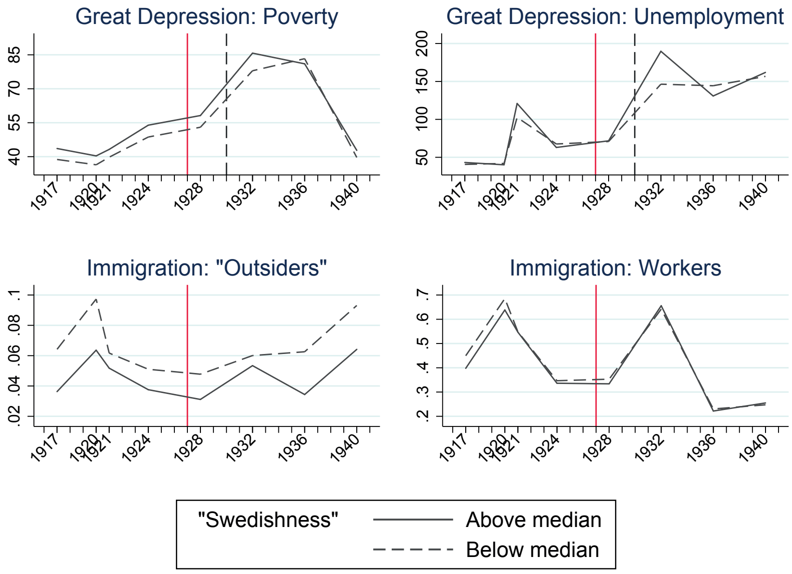
Figure 2.15: Swedish National Socialist election poster, 1930s

Note: Top of poster reads: "Wake up, Sweden!". Bottom of poster reads: "Away with the class struggle! Forward the National Socialists! The workers of the hand and the mind. Unity and people's community!". Author's translation.

Figure 2.16: Borgerliga (Conservative Right) election poster, 1932

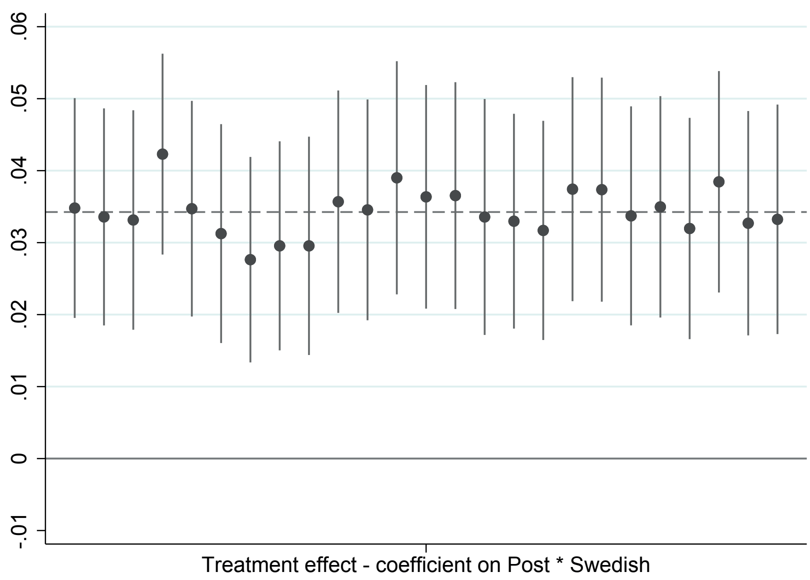
Note: Poster reads: "Work and self-sufficiency. Law and order. Liberty and defence. Vote for the Borgerliga". Author's translation.

Figure 2.17: Evolution of potential confounders, 1917-1940



Note: Raw data, per 1000 inhabitants. See text for details on variable definitions.

Figure 2.18: Robustness to excluding each county



Note: Each coefficient is from a regression dropping one county in turn. 90% confidence intervals shown. Dashed line represents the estimate from unrestricted regression.

Table 2.10: Election results - robustness to potential confounders

	Dependent variable: vote share of right wing parties						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post × Swedish	0.0342***	0.0338***	0.0343***	0.0330***	0.0346***	0.0346***	0.0337***
	(0.00908)	(0.00909)	(0.00908)	(0.00868)	(0.00895)	(0.00896)	(0.00843)
Turnout		-0.116***					-0.123***
		(0.0381)					(0.0375)
“Outsider” immigration p.c.			-0.0129				-0.0679
			(0.0441)				(0.0468)
Working immigration p.c.				0.0471***			0.0496***
				(0.0146)			(0.0149)
Poor per 1000					0.687***		0.854***
					(0.263)		(0.246)
Jobseekers per 1000						-0.0001	-0.0001**
						(0.0001)	(0.0000)
District fixed effects	Y	Y	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064	3,064	3,064
R-squared	0.440	0.444	0.440	0.446	0.446	0.441	0.459

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta \text{Post}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median “Swedish”. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.11: Election results - robustness to different treatment definitions

	Dependent variable: vote share of right wing parties			
	(1)	(2)	(3)	(4)
Post × Swedish	0.0342***			
	(0.00908)			
Post × cephalic index		0.0152***		
		(0.00379)		
Post × morphological index			0.00967**	
			(0.00417)	
Post × Swedish Q2				-0.0237
				(0.0147)
Post × Swedish Q3				0.00706
				(0.0114)
Post × Swedish Q4				0.0389***
				(0.00951)
District fixed effects	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y
Election FE × cross-sectional chars.	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064
R-squared	0.440	0.437	0.432	0.448

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta \ \text{Post}_t \times \text{Swedish}_i + X'_{ict} \ \beta_1 + X'_{ct} \ \beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Post × cephalic index is a standardised measure of cephalic index (such that large values are more "Swedish") multiplied by the Post indicator. Post × morphological index is defined similarly. Post × Swedish Q2, Q3 and Q4 are indicators for quartiles of Swedishness multiplied by the Post indicator; the bottom quartile is omitted. Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Table 2.12: Election results - robustness checks by land and employment shares

	Dependent variable: vote share of right wing parties					
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Swedish	0.0342***	0.0336***	0.0351***	0.0372***	0.0338***	0.0362***
	(0.00908)	(0.00942)	(0.00880)	(0.00927)	(0.00908)	(0.00925)
Elec. FE × agr. land sh.		Y				
Elec. FE × agr. emp. sh.			Y			Y
Elec. FE × ind. emp. sh.				Y		Y
Elec. FE × trade emp. sh.					Y	Y
District fixed effects	Y	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y	Y
Basic controls	Y	Y	Y	Y	Y	Y
Election FE × cross-sect. chars.	Y	Y	Y	Y	Y	Y
Observations	3,064	3,064	3,064	3,064	3,064	3,064
R-squared	0.440	0.442	0.447	0.445	0.445	0.453

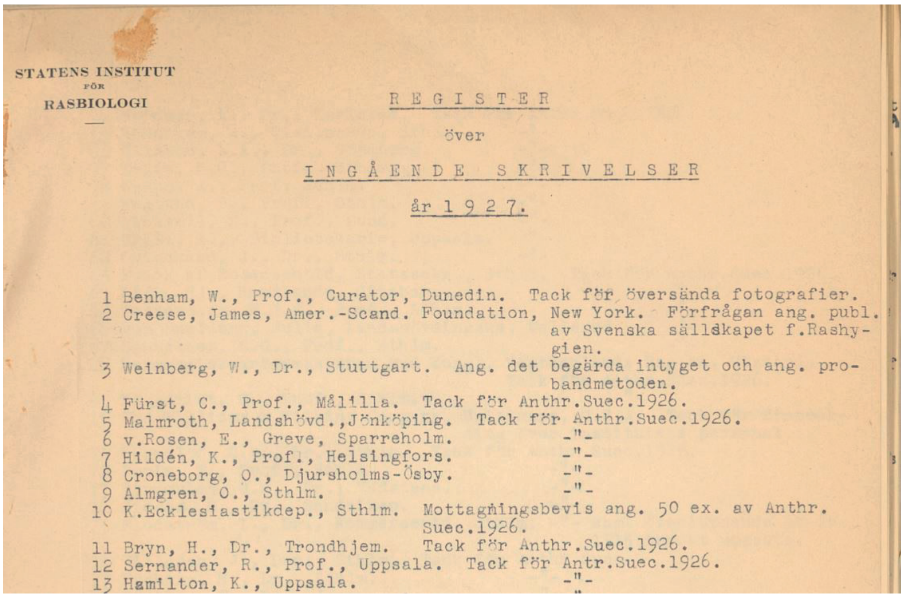
Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment. Agr. land share is the share of land used for agricultural activities (e.g. crop cultivation, animal rearing, etc.) as of the 1927 agricultural census. Employment shares in agriculture, industry and trade are from the 1920 employment census.

Table 2.13: Election results - robustness checks by fixed effects specifications

	Dependent variable: vote share of right wing parties					
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Swedish	0.0359***	0.0342***	0.0173**	0.0142*	0.0212**	0.0162*
	(0.00979)	(0.00908)	(0.00834)	(0.00743)	(0.0107)	(0.00841)
District fixed effects	Y	Y	Y	Y	Y	Y
Election fixed effects	Y	Y	Y	Y	Y	Y
County-specific time trend			Y	Y		
County × election fixed effects					Y	Y
Basic controls	Y	Y	Y	Y	Y	Y
Election FE × cross-sect. chars.		Y		Y		Y
Observations	3,064	3,064	3,064	3,064	3,064	3,064
R-squared	0.381	0.440	0.475	0.519	0.579	0.615

Note: Regressions of the form $\text{Rightwing}_{ict} = \gamma_i + \eta_t + \delta\,\text{Post}_t \times \text{Swedish}_i + X'_{ict}\beta_1 + X'_{ct}\beta_2 + \epsilon_{ict}$. Robust standard errors clustered by treatment region in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Post × Swedish = 1 if year > 1927 and if region is above-median "Swedish". Basic controls: male population, population density. Time × cross-sectional chars. contains each election year interacted with cross-sectional characteristics of the election district, including: indicator for urban regions, indicator for industrial regions, income p.c. at treatment, wealth p.c. at treatment.

Figure 2.19: Registry of incoming correspondence, 1927 (excerpt)



STATENS INSTITUT
FÖR
RASBIOLOGI

R E G I S T E R

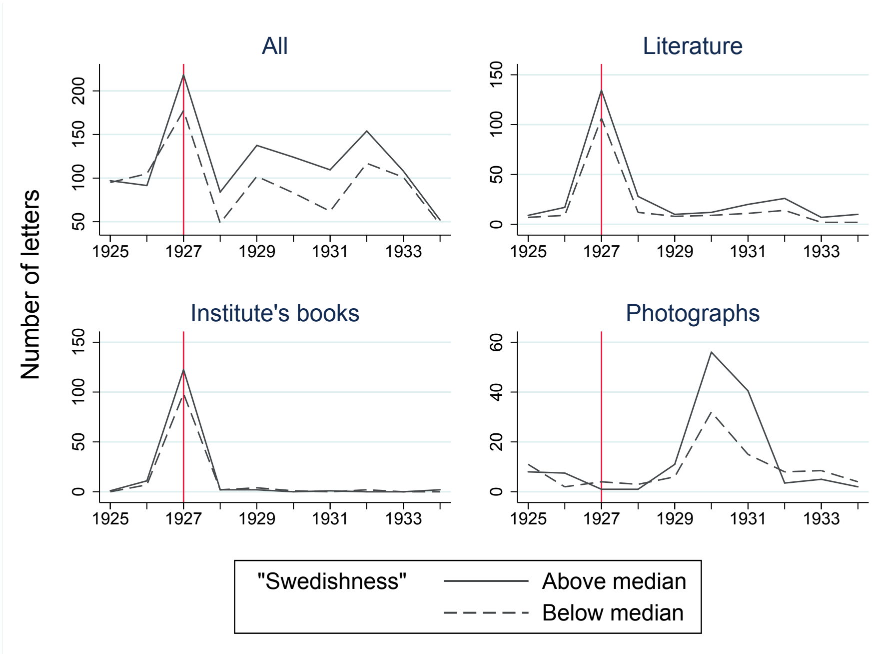
över

I N G Å E N D E   S K R I V E L S E R

år 1 9 2 7.

1 Benham, W., Prof., Curator, Dunedin. Tack för översända fotografier.
2 Creese, James, Amer.-Scand. Foundation, New York. Förfrågan ang. publ. av Svenska sällskapet f.Rashygien.
3 Weinberg, W., Dr., Stuttgart. Ang. det begärda intyget och ang. probandmetoden.
4 Fürst, C., Prof., Målilla. Tack för Anthr.Suec.1926.
5 Malmroth, Landshövd.,Jönköping. Tack för Anthr.Suec.1926.
6 v.Rosen, E., Greve, Sparreholm. -"-
7 Hildén, K., Prof., Helsingfors. -"-
8 Croneborg, O., Djursholms-Ösby. -"-
9 Almgren, O., Sthlm. -"-
10 K.Ecklesiastikdep., Sthlm. Mottagningsbevis ang. 50 ex. av Anthr. Suec.1926.
11 Bryn, H., Dr., Trondhjem. Tack för Anthr.Suec.1926.
12 Sernander, R., Prof., Uppsala. Tack för Antr.Suec.1926.
13 Hamilton, K., Uppsala. -"-

Figure 2.20: Incoming correspondence, 1925-1934



Note: Incoming letters of the *Institute* by subject.

Figure 2.21: Sweden Democrats election poster, 2014

Note: Poster reads: “Less immigration here, more help to refugees there!”. Subtitle reads: “The Sweden Democrats: Security and Tradition”. Author’s translation.

Chapter 3

Wars, Local Political Institutions and Fiscal Capacity:

Evidence from Six Centuries of German History

3.1 Introduction

In the European context it has long been argued that wars fostered state formation (Tilly, 1975). This includes the political representation of citizens in national assemblies (Downing, 1993; Stasavage, 2010) and the development of sophisticated nation-wide systems of taxation to broaden the tax base and to raise tax revenues, for instance via income taxes.[1] Examples of this are the first income taxes in Britain

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[1] Income taxes are sophisticated compared to simpler forms of taxation like trade or head taxes that do not require an infrastructure to survey the wealth or income of the population. See Besley and Persson (2013, p. 59): "To collect trade taxes just requires being able to observe trade flows at major shipping ports. Although trade taxes may encourage smuggling, this is a much easier proposition than collecting income taxes, which requires major investments in enforcement and compliance structures throughout the entire economy."

due to the Napoleonic Wars, or in the U.S. at the start of the Civil War (Besley and Persson, 2009).

Representative political institutions and sophisticated tax systems, however, evolved much earlier at the sub-national level, namely in the cities (Stasavage, 2011),[2] long before the occurrence of such institutions at the national level in the eighteenth and nineteenth centuries. For example, after a 20-months long siege by the troops of the Archbishop of Cologne in 1389, the city of Dortmund introduced a 5 percent income tax in 1393 to cope with the wartime debt burden. In 1400, the citizens of Dortmund revolted and demanded more representation on the city council (*Rat*). This led to a reform of the council to include the so-called *Zwölfer* ("The Twelve") who henceforth represented the citizens' interest.

What explains this relationship between warfare, inclusive political institutions, and more efficient systems of taxation at the local level? Tilly (1975) hypothesises that rulers, especially those of smaller polities with a weaker position, required the consent of their people to increase tax revenues to finance warfare.[3] To acquire such consent, Tilly claims that rulers offered political powers in exchange. Wars are therefore crucial shocks to disturb equilibria in which rulers first tax sectors of the economy over which they have more power,[4] as opposed to sectors where increased taxation requires the consent of the people which has to be acquired by surrendering political powers. Since wars were expensive, they easily forced rulers to raise tax revenues beyond what could be obtained without asking for consent.

This theory can potentially explain the effect of warfare on the evolution of inclusive political institutions and the development of more elaborate forms of taxation at the local level much before the nineteenth century when such institutions

[2] See Wahl (2019) for work on the evolution of representative political institutions in German cities during the Middle Ages.

[3] Stasavage (2011) argues that smaller city states were able to build up fiscal apparatuses because they were smaller and could more easily solve the coordination between taxation and spending priorities. Rubin (2017) makes the more general observation that rulers need legitimacy and coercive power. Assemblies can provide both: democratic legitimacy and tax revenue needed to coerce.

[4] As in the two-sector model of Hoffman and Rosenthal (1997) where a ruler controls one sector which he can tax freely while in the other sector the consent of the elite is required.

evolved at the national level. However, so far there is no empirical evidence to support it.

Studying how warfare affected the evolution of political institutions and tax systems at the sub-national and especially at the city level is challenging. Oftentimes such data is hard to find for a sufficiently large sample and period of time. However, the importance of cities as precursors of nation-wide systems of sophisticated taxation and representative political institutions can hardly be overstated. In pre-industrial Europe, cities were the driver of political and economic innovation (Wahl, 2019), and the primary providers of fast tax revenues to finance warfare (Van Zanden et al., 2012). They were also fundamental drivers of growth. Bosker et al. (2013) argue that local participative institutions in cities explain the urban development that allowed Europe to eventually outpace the Islamic world. This view is consistent with recent theories on citizens' involvement in governing and the efficiency of taxation (Acemoglu et al., 2011).

In this chapter, we present novel data on the universe of cities in the German Lands from 1200 to 1750 which we digitised from city-level records. We show that higher incidences of violent conflicts had a positive effect on the evolution of representative political institutions and sophisticated tax systems at the local level. Information on cities is observed in every decade for more than 2,300 cities and was obtained from the *Deutsches Städtebuch* Keyser (1939-1974). Our data have three important features that allow us to study the relation between warfare, representative political institutions, and sophisticated methods of taxation at a granular level.

First, we observe crucial information each city's political institutions to measure the citizen's electoral power, representativeness of institutions, and the division of power. To capture citizen's electoral power we consider as outcome whether citizens could elect their city council without the interference of the local ruler. Representativeness is proxied by the size of the council which has been argued to be positively related (Kjaer and Elklit, 2014). We measure the division of power by considering councils on which neither members of the executive nor the judiciary are present. Our focus on councils as representative political institutions is motivated by the fact that they were the "chief means of seeking consent [to tax] at which representatives from different parts of a society would be able to express themselves" (Stasavage, 2016, p. 147).

Second, we collected detailed information on the number and types of taxes levied in 267 large cities that are also covered in Bairoch et al. (1988). We construct measures of the sophistication of a city's tax system as the share of income, wealth, and inheritance taxes among the total taxes raised. This provides us with a novel way to assess the impact of warfare on a city's tax base and the quality of its taxes over a long period of time and much before the introduction of nation-wide systems of income taxes in the eighteenth and nineteenth centuries.

Third, we observe violent conflicts that directly affect the city, such as sieges, nearby battles, sackings, or (partial) destruction. We are the first to extend data on violent conflicts back to the 13th century and to provide a level of detail on the types of conflicts that is not available in conventionally used sources that focus on battles, such as Clodfelter (2008).

A key challenge for identification is the potential endogeneity between warfare and political institutions and taxation. This may be due to issues of reverse causality as conflict may not only force the evolution of more efficient tax systems, but that a higher ability to increase tax revenues could lead to increased participation in wars. A similar argument is made by Gennaioli and Voth (2015) in the context of warfare and state capacity.

To give our estimates a causal interpretation, we exploit changes in the nobility networks across more than 680,000 German and European nobles to instrument for conflict intensities. To make this instrument arguably more plausible, we control for the number of direct links of the nobles. This means that we exploit variation in the parts of the network that are not a direct choice of the nobles themselves (as their direct links would be) but that affect their centrality in the network. We show that as the centrality of a territory's nobles decreases, the more likely it is to be involved in subsequent violent conflicts.[5]

We find positive and significant effects of conflict intensity faced by cities and the evolution of representative political institutions and a more sophisticated tax system. We measure conflict intensity as the share of cities of a territory that experience a violent conflict in a given decade. Our instrumental variables regressions show that a one percentage point increase in this conflict measure is associated with a 14.8 percent increase in the probability that citizens elect the council without interference of the local ruler, a 13 percent increase in the size of the council, and a 23 percent decrease in the probability that the executive and judiciary are represented on the council relative to the outcome averages. These findings are robust to different definitions of territories or the instrument, assignment of conflicts from the territory to the city-level, or sample composition. Our results can explain 27 percent of the overall increase in citizens electing their councils, and 20 percent in the overall increase of council sizes between 1200 and 1750. While the independence of councils over this time period has declined, it would have declined 24 percent more in the absence of all warfare over the entire period.

The results on the relation between warfare and taxes show a negative effect on the number of taxes raised by a city but an increase in the efficiency of the tax system. We also find evidence of long-term dynamics that reinforce this development. Fifty years later, a one percentage point increase in warfare is associated with an increase in the share of sophisticated taxes by 17 to 24 percent. This result can explain between 33 and 57 percent in the overall increase in sophisticated forms of taxation between 1200 and 1750.

We contribute to the following strands of the literature.

[5] Benzell and Cooke (2018) show a link between cross-country kinship ties among European monarchs and reduced conflict intensity in Europe over time.

First, based on the theoretical work by Tilly (1975, 1990) a rich empirical literature has studied the relation between warfare and political institutions (e.g. Downing, 1993; Dincecco et al., 2011; Karaman and Pamuk, 2013; Dincecco and Wang, 2018). However, Stasavage (2016, p. 155) points out that so far, "the evidence suggests some causal link between warfare and representative institutions, although of course we do not know in which direction causality runs." We therefore contribute two insights to this debate by i) providing evidence of a positive causal effect that runs from warfare to representative political institutions and ii) by presenting the first evidence of this relationship using granular sub-national data over a long period of time.

Second, previous work studying the impact of warfare on taxation has mainly focused on tax revenue and on the *quantity* rather than the *quality* of taxes (e.g. Besley and Persson, 2009; Dincecco et al., 2011; Dincecco and Prado, 2012; Scheve and Stasavage, 2010, 2012; Voigtländer and Voth, 2013; Gennaioli and Voth, 2015). This difference matters. The inability to broaden the tax base by moving from trade to income taxes has been related to the persistence of weak states Herbst (2000).[6] We provide new evidence on the relationship between warfare and the evolution of sophisticated systems of taxation that provide a broader tax base and a more efficient way to raise tax revenues.

3.2 Related Literature

The historical roots of state capacity and its relationship with warfare is prominently studied by Tilly (1975, 1990). He argues that the increasing cost of warfare following military innovations in pre-modern Europe created a demand for more efficient means of extraction of war funds. It was this need for extraction that gave rise to systems of taxation, the expansion of state capacity, and the emergence of the

[6] Even nowadays poorer countries are characterised by a less sophisticated tax system and narrower tax bases, suggesting a substantial role of taxation in development and growth (see Burgess and Stern, 1993).

nation state. Besley and Persson (2009, 2010) develop a formal theoretical framework for modelling the determinants of state capacity.[7] In their framework, warfare and conflict are key drivers of the development of state capacity, as states develop centralised systems of taxation to finance warfare. Inclusive political institutions can have an impact on state capacity but are taken as exogenous. In theoretical work, the direction of causation in the nexus between warfare, state capacity and inclusive political institutions is ambiguous.

Downing (1993) argues that states relying on internal sources of revenue during the military revolution built extensive autocracies. A standing army could potentially be used for two purposes. Professional soldiers sworn to the local ruler could not only deter and defend against outside forces but could also be employed to oppress internal opposition from the local populace or elites. Stasavage (2016), on the other hand, argues that the need to finance wars came with a trade-off for rulers. To obtain more war funds rulers were compelled to offer their subjects a certain degree of political power via representative institutions. This line of argumentation is particularly relevant for Germany where the high degree of geographic fragmentation created relatively weak rulers. Stasavage (2016, p.155) notes that: "the evidence suggests some causal link between warfare and representative institutions, although of course we do not know in which direction causality runs."

Studies of the nexus between warfare, state capacity, and democratic institutions are scarce. A notable exception is Dincecco et al. (2011), who explore correlations between the threat of external conflict, the need for taxation and subsequent constitutional reform in nineteenth-century Italy. However, most previous work has considered either conflicts and institutions, or conflicts and state capacity, but not the joint relation between the three. In a theoretical contribution, Gennaioli and Voth (2015) model the effect of the military revolution on the need for increased state capacity to finance wars. The need for fiscal innovations to raise war

[7] Besley and Persson (2013) point out that *fiscal capacity* would be the more precise term to describe what is typically coined *state capacity*.

revenues is also emphasised by Dincecco and Prado (2012) as key for the expansion of fiscal capacity. In a recent survey, Johnson and Koyama (2017) highlight Prussia and Russia as prime examples of "fiscal military states *par excellence*" due to the bellicose underpinnings of investments in state capacity in those regions.

The relationship between inclusive institutions and state capacity is, to our knowledge, less well-studied. Karaman and Pamuk (2013) provide evidence that tax collection was done more efficiently by representative regimes in urban economies. Authoritarian regimes, on the other hand, are shown to be more efficient at state building in rural and agrarian economies. In recent work, Angelucci et al. (2018) present causal evidence that the self-administration of tax collection in medieval English merchant towns was instrumental in creating more inclusive institutions; these towns were later granted representation in Parliament to allow the king to negotiate extraordinary taxes with them.

Finally, there is a large literature on the link between conflict (in a broad sense) and political institutions. Acemoglu and Robinson (2000) develop a model where elites strategically grant citizens the right to vote in order to avoid social unrest and revolution. This theory is brought to the data by Aidt and Franck (2015), who show that the threat of revolution induced votes in favour of democratisation in the context of the British Great Reform Act of 1832. Most related to this chapter is the theoretical contribution by Ticchi and Vindigni (2008), who postulate a model in which democratisation follows endogenously from the need to conscript citizens to fight wars.

There is some evidence in the literature that suggests that both state capacity and inclusive institutions are beneficial for historic economic development.[8] Dincecco and Katz (2016) relate state capacity improvements to long-run economic

[8] We show evidence for an effect of wars on both state capacity and inclusive institutions. We thus provide evidence for one pathway from wars to economic development, via state capacity and representative institutions. Of course, there are alternative explanations how wars affected long-run development. Dincecco and Onorato (2017) argue that cities grew faster as a result of wars as they offered a 'safe harbour' against pillaging. Hoffman (2015) claims that constant warfare led Europe to develop technologies that allowed it to conquer the rest of the world.

growth and Dincecco (2015) also to the establishment of twentieth-century welfare states.[9] Wahl (2019) shows that participative political institutions had a positive effect on economic outcomes of German cities, with the exception of craft guilds participating in the city council, which had had zero or negative impact.[10] Our work on the rise of state capacity and inclusive political institutions in the German lands is therefore informative about two of the sources of the long-run development of the German economy.

The contribution of this chapter is its focus on the nexus between warfare, state capacity and inclusive political institutions. To identify causal relationships between warfare and our outcomes of interest, we turn to the literature on the determinants of historical conflict in Europe. In particular, we propose an instrument for conflicts that uses shocks to the position of German nobles in the wider European nobility network. Tilly (1975) notes a strong interrelation within the European nobility, a fact which according to Benzell and Cooke (2018) explains the general decline in violent conflicts between European states. They construct a network of the European ruling families and show that those with more interconnectedness tended to fight fewer wars. Polities governed by female rulers, on the other hand, were more likely to engage in conflict (Dube and Harish, 2019). Married queens were more effective at forging alliances and to use these strategically to fight wars. The rich backdrop of nobility networks as a driver of war and peace in Europe informs our choice of instrument, and is explained in more detail below.

[9] Borcan et al. (2018) take a perspective over 6 millennia and show that the current level of economic development across countries has a hump-shaped relationship with accumulated state history.

[10] This qualification on guilds supports Ogilvie (2014) who holds a sceptical view of guilds, because they typically generated a particularised trust among its own members, but did not automatically support more generalised trust supporting broader economic growth.

3.3 Data

3.3.1 German City-Level Data

The main data source is the *Deutsches Städtebuch* (Encyclopedia of German Cities), a series of volumes edited by Erich Keyser (1939-1974) that provide information on each city in the German Empire incorporated prior to the compilation of the *Städtebuch*. The book offers a systematic treatise of the history of German cities from their foundation until the twentieth century. A separate article is devoted to each city, following a consistent structure that divides the city history into twenty categories. These include sections on a city's past names, its geographic location, its local economy, educational and church systems, and so on. Particularly relevant for our purposes are section nine on the administration of the city, section eleven on warfare and conflicts experienced by the city, and section 13 on its financial system (including its means of taxation).

Political Institutions

We collect information on the different types and numbers of political institutions, as well as information on how and by whom the institutions were chosen. The types of political institutions we consider are the executive (mayors, sheriffs), legislative (councils) and judiciary (judges) branches of a city's administration. Using information from the *Städtebuch*, for each institution we record the year in which it is introduced or first mentioned, including start and (where applicable) end dates, the number of people within a given institution,[11] and the identity of members within each institution. The latter information allows us to capture cases where, for instance, the mayor of a city is also the judge or the head of the council. Finally, we collect data on the electing body for each institution.[12]

[11] A council is typically composed of multiple members and, though less common, also several mayors, judges or sheriffs could exist at the same point in time.

[12] Elections are classified into eight types: (i) direct elections by the citizens, (ii) by the citizens but with a final say by the local lord, (iii) by the lord only, (iv) by the council, (v) by the council

In a given century, the majority of cities were ruled by lords or bishops and, as a result, not fully self-governing.[13] City councils, however, had legislative and administrative power in the local context. Examining various characteristics of councils is therefore informative of the quality and representativeness of local political institutions. To this end, we construct three main political institution variables using the information collected from the *Städtebuch*. First, to capture the opportunities for political participation by citizens, we define an indicator taking a value of one if the council is directly elected by citizens without the interference of the local lord. Second, to capture the strength and breadth of the council, we define a count variable of the number of council members. Third, to capture the independence of the council and the division of power between the branches of administration within a city, we define an indicator taking a value of one if a judge, mayor or sheriff is a member of the council. Concretely, larger values of the first two variables and smaller values of the third variable are indicative of more inclusive political institutions.

Conflicts

Our main explanatory variable is a measure of a city's exposure to conflict. From the relevant section of the *Städtebuch*, we record for each city the dates and durations of violent conflicts in which the city was involved. The conflict information in the *Städtebuch* is detailed, and we are able to classify each conflict according to its type. We capture involvements elsewhere (if the city engaged in raids or wars in other territories), battles fought in the vicinity of the city, sieges, sackings, partial destruction of the city, complete destruction of the city, and occupation. We therefore have a rich set of information both on the occurrence of conflicts as well as their nature.

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with a final say by the lord, (vi) elections by other bodies (e.g. the court jury), (vii) unknown electoral bodies, or (viii) unknown electoral bodies with a final say by the lord.

[13] The exception are imperial cities, which were entirely self-governed.

The level of detail with which we capture city-level instances of conflict is significantly more comprehensive than other frequently used sources, such as Brecke (1999) and Clodfelter (2008).[14] These sources begin in 1400 and 1494, respectively, while our data allows us to extend further back in history. More importantly, these sources focus primarily on battles. While battles are no doubt important considerations for local rulers, we are also able to capture concerns related to other forms of conflict. Indeed, extensive sieges or occupations (which can last months, years, or even decades) plausibly exert greater pressure on rulers to tax than more short-lived battle events.[15]

Taxation

The final component of the causal nexus we explore in this chapter is state capacity. We focus on fiscal capacity - the state's ability to levy and collect taxes - and collect information on cities' taxation from the *Städtebuch*. Due to data availability we collect this information only for the largest cities: the 267 German cities that appear in Bairoch et al. (1988). We are interested in exploring not only the establishment of systems of taxation, but also their sophistication. To this end, we categorise individual taxes into distinct types: (i) general taxation, such as head taxes and taxes without a specifically stated purpose, (ii) taxes on obtaining or maintaining citizen rights (Burgher taxes), (iii) property taxes (on houses or land inside the city), (iv) land taxes (on farms or land outside the city), (v) income and wealth taxes, (vi) inheritance taxes, (vii) tax on alcoholic beverages, (viii) business taxes (including taxes on guilds), and (ix) trade taxes, such as tariffs and duties. We consider a tax

[14] Examples of the use of these battle datasets include Dincecco and Prado (2012), Kokkonen and Sundell (2017) and Iyigun et al. (2017*a*,*b*)

[15] To illustrate the advantage of our data, consider the conflict data used by Iyigun et al. (2017*b*), which combines Brecke (1999) and Clodfelter (2008). Their focus is on Europe, Northern Africa and the Near East during the period 1400-1900, for which they record a total of 2,787 battles. Our conflict data, which focuses on a much smaller geographical region (the German lands) records a total of 4,133 city-level conflict events for the same period. This is illustrative of the greater local detail we capture. Of course, our temporal focus is slightly different: our sample period consists of the years 1200-1750, during which we record a total of 3,582 city-level conflict events.

to be sophisticated if the activity to be taxed is not easily observable. Sophisticated taxes therefore include property taxes, income and wealth taxes, and inheritance taxes.[16] Unsophisticated taxes include general taxes, Burgher taxes, land taxes, alcohol taxes and trade taxes.

3.3.2 Data on Sovereign Territories

We link cities from the *Städtebuch* to sovereign territories using the *Euratlas* (Nüssli, 2009). In 100-year intervals, we observe the borders of all sovereign states of Europe. This allows us to geographically link each city in the *Städtebuch* to the territory to which it belonged each century. Figure 3.3 in the Appendix shows the evolution of these territories as well as the (fixed) location of the 2,340 cities in the *Städtebuch*.

3.3.3 Data on the German Nobility

To build a network of German nobility and link information about nobles to the cities in the *Städtebuch*, we combine two data sources. The first is the *Peerage* project (Lundy, 2018) which stores data on more than 680,000 European nobles. The *Peerage* database contains information on nobles' dates of birth, death, and marriages. In addition, we collect basic information on sex and age. Further, the *Peerage* contains information which allows us to link each noble to their parents, siblings, spouses and children. As an example, Figure 3.4 in the Appendix shows The Peerage entry for Georg Wilhelm, Duke of Braunschweig and Lüneburg. Based on this information, we are able to reconstruct the European nobility network at any given point in time.

To supplement this data, we digitise information from the *Europäische Stammtafeln* (European Family Trees, Schwennicke (1998)), in particular Volumes 1-1, 1-2 and 1-3. These volumes cover 379 family trees of ruling families in the German

[16] Business taxes could plausibly be considered sophisticated. In our empirical analysis, therefore, we consider measures both including and excluding business taxes as sophisticated taxes.

lands.[17] Figure 3.5 in the Appendix shows an example of a family tree for the dukes of Braunschweig and Lüneburg, and a detailed individual entry is shown in Figure 3.6. Note that this entry is the same individual, Georg Wilhelm, as identified in the *Peerage* example above. The *Stammtafeln* provide additional valuable information on locations of births, deaths, marriages and other events, which allows us to link individual nobles to cities and territories within the German lands. Where other information is missing in the *Peerage*, we also supplement this with data from the *Stammtafeln*.

We use the information on the locations and lives of nobles to link them spatially and temporally to the *Städtebuch* cities and *Euratlas* sovereign territories. We use the data on parental, sibling and marital ties between nobles to reconstruct the network of the German nobility each decade, yielding a potentially disconnected, undirected, unweighted graph.[18] We compute several statistics that characterise the network and nobles' relative positions within it. A commonly used measure of centrality is degree centrality: the number of direct links a noble has to other nobles. This simple measure, however, fails to capture the complexities of nobility networks in this time period. Rather, we would like to capture, for example, the importance of nobles whose links unite two separate dynasties. To our knowledge, the most appropriate measure which is tractable for disconnected networks is harmonic centrality, which is computed as:

$$H(x) = \sum_{x \neq y} \frac{1}{d(x,y)} \tag{3.1}$$

The harmonic centrality $H(x)$ is a measure of the distance of noble x to the rest of the network. The pairwise shortest-path distance $d(x, y)$ is calculated between

[17] In our empirical analysis, we concentrate on the network positions of nobles from Volume 1-1 only. These are nobles from the most important 174 ruling houses in the German lands, and therefore the key players determining war and peace in this period.

[18] We consider each of the following relationships to constitute a direct link between nobles: parent, child, sibling, spouse.

x and each other noble y. A large value for $d(x, y)$ means that x is far from (and therefore poorly connected to) y. Taking the inverse of this distance and summing over all nobles y yields an intuitive measure where larger values correspond to higher centrality. Additionally, harmonic centrality provides a straightforward way to allow for unconnected nodes in the graph. For any two unconnected nobles x and y, we set $d(x, y) = \infty$ such that an unconnected noble-pair's contribution to $H(x)$ is zero. We calculate this measure for each noble alive in a given decade using the full *Peerage* sample of 680,000 individuals. In Figure 3.7 in the Appendix we provide an example of the largest component of such a network in the year 1460, with the most central nobles (according to the harmonic centrality measure) highlighted.

3.3.4 Descriptive Statistics

For the majority of our analysis, we follow Cantoni et al. (2018) and drop cities which are reported in a 'Small State of the Holy Roman Empire' in the *Euratlas*. This leaves 1,472 cities which we observe at decadal intervals for the period 1200-1750. Descriptive statistics for the cities in our main sample are reported in Panel A of Table 3.1. The first three variables capture the presence of the three main institutional branches in each city-decade. Executive, judiciary and legislative institutions are present in 47, 13 and 44 percent of city-decade observations, respectively. Turning to measures of institutional quality, 5 percent of councils are elected directly by citizens, and the average council has around 9 members. Finally, roughly one quarter of councils are not fully independent. That is, a mayor, sheriff or judge is also a member of these councils.

Our main measure of conflict exposure is defined on the *Euratlas* territory level. Since war and peace are determined by territorial lords, intuitively the impact of conflict will be felt in all cities in a territory. Concretely, we use a measure of conflict intensity, which takes the share of cities in a given territory that experience conflict in a given decade. The summary statistics for this variable in Panel A of

Table 3.1 reveal substantial variability: while the average city-decade is relatively peaceful (only 2 percent of cities in its territory experienced conflict), there are periods of intense warfare (where all the cities in the territory experience conflict).

To measure nobility network centrality, we use the harmonic centrality of the best-connected noble in a territory. We also construct the average degree centrality of nobles in a territory. Both these variables can intuitively be set to zero for those cities in territories without any members of the highest levels of aristocracy. The final four rows of Panel A of Table 3.1 report summary statistics for these variables. There is considerable heterogeneity: some territories have very well-connected nobles with a harmonic centrality four standard deviations above the mean, while some territories have nobles without any links at all.

As explained above, we only observe taxation information for the larger cities in Bairoch et al. (1988). Summary statistics for these cities are reported in Panel B of Table 3.1. For completeness, we report the same variables as for the full sample in addition to the taxation variables. On average, these cities have more well-developed political institutions. Since conflict and nobility measures are defined at the territorial level, values for these variables are very similar to those in the full sample. In the average Bairoch city-decade, 1.31 taxes are levied. There are predominantly 'simple' taxes, with 'sophisticated' taxes being relatively rare. These is considerable heterogeneity, however: some cities have four times as many sophisticated taxes as simple taxes. This suggests that in this time period, these larger cities were already beginning to develop relatively intricate systems of taxation, which is indicative of high degrees of fiscal (state) capacity.

3.3.5 Motivational Evidence

Before describing our empirical strategy and presenting our results in Section 3.4 below, we conduct a suggestive 'event study' exercise, using the Thirty Years' War as a motivating example. In particular, in Figures 3.1 and 3.2, we plot the evolution of citizens' involvement in electing the council, as well as the council size, separately for those cities that experienced and for those that did not experience conflict during this intense period of warfare. Strikingly, cities that were spared conflict stagnated in terms of their development of inclusive political institutions, in contrast to those cities which did see conflict in this period. This exercise is informative but, of course, only suggestive. We now turn to a formal empirical strategy with the aim of uncovering the joint causal effect of warfare on local political institutions and fiscal capacity.

3.4 Empirical Strategy and Results

To study the relationship between inclusive political institutions and the kinds of taxes raised by a city with warfare in a sovereign territory, we regress

$$y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist} \tag{3.2}$$

where cities are indexed by subscripts i, sovereign states by s, and decades by t. We consider two types of outcomes y_{ist}.

The first are measures of the inclusiveness of political institutions, such as an indicator for whether citizens elect the council without interference of the local ruler, the size of the council, and whether members of the judiciary or executive are present on the council and thus could potentially exert influence on the legislative.

The second set of outcomes are the total number of different taxes raised by a city in a given decade. *Simple* taxes include easily observed quantities like head taxes, alcohol, or trade taxes, whereas *sophisticated* taxes require more elaborate enumeration of the population and their possessions. This includes wealth and income taxes, or inheritance taxes, i.e. assets that require more effort to accurately observe by the authorities. The tax outcomes are only collected for the larger Bairoch et al. (1988) cities.

The variable $\text{Conflict}_{s,t-1}$ measures the conflict intensity in a given state in the previous decade. This is to exclude the possibility that conflicts and changes in the outcome fall into the same decade t in which case it would not be obvious whether a conflict actually predates the outcome change.[19] Conflict intensity is defined as the number of cities in state s experiencing a violent conflict in decade t over the total number of cities in that territory times one hundred. Territorial borders are assigned to cities at the start of a given century. Border information is taken from the *Euratlas*.[20]

The regression includes city fixed effects α_i which capture time-invariant factors that lead to differences in the outcomes across cities. Aggregate shocks over time that affect all cities are absorbed by the decade fixed effects λ_t, whereas additional time varying city and institutional characteristics are included in the vector X_{ist} such as an indicator for whether a council is present or the average number of direct nobility network links of nobles in a territory.

All other variation in the outcome is left in the stochastic error term ϵ_{ist}. To account for heteroskedasticity and autocorrelation, we cluster standard errors at the territorial level. More precisely, we cluster observations at the level of 'territorial histories'. That is, we generate clusters of cities that shared the same history of territorial affiliations throughout our sample period.[21]

A concern with the baseline specification in (3.2) is that conflicts are potentially endogenous. Not only is warfare a choice of the local rulers, but also the causality between conflicts and political institutions may run both ways (Stasavage, 2016). For instance, autocratic regimes tend to be more involved in conflict (Lake, 1992; Bueno de Mesquita and Siverson, 1995; Bueno de Mesquita et al., 1999;

[19]For instance, a conflict may occur in 1404 while the political institution already changed in 1400, yet both events would be labelled with the decade *1400*.

[20]Since border changes are potentially endogenous to conflicts themselves, we later show robustness checks with fixed borders by grouping together areas that have always belonged to the same states.

[21]For instance, if two cities were initially part of *Duchy X* and later on both part of *Kingdom Y*, they will be in the same territorial history cluster.

Jackson and Morelli, 2007). As such a simple OLS regression of equation 3.2 would underestimate the true effect of wars on the development of inclusive political institutions. We therefore attempt to resolve these potential issues via an instrumental variables strategy.

3.4.1 First-Stage Relation between Nobility Network Centrality and Conflict Intensity

We use changes in the centrality of ruling families as shocks to the conflict intensities experienced by German territories.[22] As explained in Section 3.3 above, we track the position of German nobles within the wider European nobility network, and compute measures of connectedness for these nobles and link them to the cities and territories in our sample. More central nobles can build on the support of a larger set of allies which makes attacking them relatively more costly for an outside force.

The first stage regression to predict conflict intensities is specified as follows:

$$\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma \text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st} \tag{3.3}$$

where $\text{Centrality}_{s,t-1}$ is the harmonic centrality index value for the most connected noble in the state in $t-1$. The most influential noble would typically be the head of the ruling family.[23] In order to avoid concerns related to endogenously shifting borders, we assign the nobility centrality measures on the level of the territorial history.

An important control in the vector X_{ist} is the average direct connectedness of nobles in territory s. Variation in the harmonic centrality index used to construct $\text{Centrality}_{s,t-1}$ comes from two sources. First, from the direct links of nobles in

[22]The idea is similar to that of Benzell and Cooke (2018), who use links between European ruling houses to explain the aggregate decline in warfare propensity over the course of European history. Their analysis is on the level of European countries, whereas our focus is on territories within the wider German lands.

[23]Other measures of centrality, such as the average or median centrality of nobles in the territory, are possible. We use such alternative methods to probe the robustness of our results.

territory s with other nobles in the European nobility network. Second, conditional on nobles' direct links, centrality may also vary due to changes in the structure of other parts of the network. It is this second type of variation which we wish to exploit, since network changes unrelated to the direct links of a state's nobility provide shocks to centrality that are exogenous to local economic, political and strategic developments. In short, by controlling for the direct links of a state's nobility, we shut down the first source of variation in $\text{Centrality}_{s,t-1}$, and identify the first-stage relationship using variation from deeper in the network structure.

To illustrate the chain between nobility, conflict and local political institutions, Figure 3.8 in the Appendix maps the spatial relationships of the first stage between harmonic centrality and conflicts in the year 1630, at the height of the Thirty Years' War. Figure 3.9 maps the raw spatial correlation between conflict and the number of political institutions that are elected by citizens in the same year. Given that this measure is computed for every state in each decade, there is no simple way of plotting these relations over time. However, the example of the Thirty Years' War in Figure 3.8 illustrates the hypothesised (negative) relationships very clearly. Cities in areas with a high degree of centrality tend to be less affected by violent conflicts during this period of intense warfare. Conversely, those with a low level of connectedness and a high warfare frequency show a higher propensity to have elected institutions.

More formal estimations of the first-stage relationship between nobility centrality and conflict intensity are reported in Table 3.2. In columns 1 and 2, we use the main nobility centrality definition in constructing our instrument: the harmonic centrality of the best-connected noble in the territory. Harmonic centrality is a strong negative predictor of conflict intensity, both with and without controls for immediate network links (degree centrality). A one-unit increase in the maximum harmonic centrality index of a given territory reduces its experienced conflict intensity by 1.3 percentage points.[24]

In the remaining columns of Table 3.2, we report first-stage results for alternative specifications of the instrument. In columns 3 and 4, we use the average harmonic centrality of nobles in a territory rather than the harmonic centrality of the best-connected noble. As additional an additional robustness check, in columns 5 and 6 we use the centrality not of nobles in the territory itself, but of nobles connected to nobles in the territory (we call these nobles *linked nobles*). Results are robust to these alternative definitions of the instrument, and the key first-stage result holds: territories that become less well-connected due to changes in the structure of the European nobility network see increases in their levels of conflict intensity.

3.4.2 Conflict Intensity and Local Political Institutions

Conflict Intensity and Council Elections

We now use the first-stage relationship between nobility centrality and conflict intensity in the instrumental variables framework described above to explore the relationship between warfare and local political institutions. The first outcome we consider is whether a city's citizens were involved in electing local councils. Concretely, in equation 3.2 above, y_{ist} will be an indicator taking a value of one if citizens elected the council without the interference of the local lord.

Results from this exercise are reported in Table 3.3. In column 1, we perform a simple OLS estimation of equation 3.2, in which we regress an indicator for whether citizens elected the council on the conflict intensity variable as well as city and decade fixed effects. Column 2 additionally controls for the presence of a council.[25] These estimates should be interpreted with caution, however, due to the likely downward bias arising from the reverse and negative relationship between conflicts and political

[24] The direction of this result is in agreement with results found by Benzell and Cooke (2018) for wars between countries.

[25] The establishment of a council is itself plausibly an outcome of conflict, which could raise concerns that it is a *bad control* in this specification. To dispel such concerns, throughout we will report results both with and without this control to show that results do not change.

institutions (that is, autocratic rulers are also likely to be more belligerent). Indeed, we do not find a systematic relationship between conflicts and council elections through a simple OLS regression.

We therefore turn to the instrumental variables strategy explained above, where we use shocks to nobility network centrality to generate exogenous variation in conflict intensity in a first stage. Column 3 reports the result from a parsimonious second stage of this IV framework, with no additional controls. We find a systematic positive relationship between conflict intensity and the probability that citizens elect local councils. This relationship is robust to controlling for council presence (column 4), and the immediate links of nobles in the territory (column 5).[26] Finally, in column 6 we include both controls, and still find a robust, positive effect of conflict intensity on the probability that citizens elect the local council.[27]

Concretely, for a percentage point increase in conflict intensity induced by a reduction in a territory's network centrality, the coefficient reported in column 6 shows a 0.003 percentage point increase in the probability that citizens elect their council. The size of the estimated coefficient needs to be assessed with respect to the overall magnitudes associated with a given outcome. Relative to the average probability that citizens elect the local council, the effect reported in column 6 corresponds to a 12.6 percent increase.

To put this finding into context, consider that the average probability that citizens elected councils rose by 3.132 percent over the sample period, 1200-1750. Over the same period, the average city experienced a conflict intensity of 2.360 percent. Using our estimate for the effect of conflict intensity on the probability

[26]Recall that this allows us to exploit variation in network centrality arising only from changes in network structure beyond local nobility links.

[27]In Table 3.8 in the Appendix, we report the corresponding reduced-form regressions with and without controlling for degree centrality in columns 1 and 2, respectively. These results are consistent with the channel we have in mind: cities in territories with well-connected nobles are less likely to be exposed to conflict, and subsequently are less likely to adopt representative political institutions. Columns 3-6 of Table 3.8 report similar reduced-form regressions for the size of the council and for council overlaps. A discussion of the effect of conflicts on these variables is presented below.

that citizens elect their council, we can explain $\frac{0.003576 \times 2.360}{0.03132} \times 100 \approx 27$ percent of the increase in council elections over the period 1200-1750.

Conflict Intensity and Council Size

Our second measure of political representativeness is the size of the city council, where larger councils are taken to better represent the interest of the local citizenry. In our historical setting, council expansions are often associated with greater direct representation of citizens. The city of Braunschweig, for example, expanded its *gemeine Rat* ('common council') in 1386 to enable direct representation of citizens from Braunschweig's distinct municipal areas.[28] We report results using council size as the outcome of equation 3.2 in Table 3.4. As before, OLS results (columns 1 and 2) are likely biased downwards, but we nevertheless find a weakly positive, though insignificant, impact of conflict exposure on council size. Turning to our instrumental variables specification, we indeed find a larger and statistically significant effect.

Taking the richest specification in column 6, a one percentage point increase in conflict intensity causes the council to expand by 0.3 members. When compared to the mean council size of 3.3 members, this effect corresponds to a 9.3 percent increase. In addition to being more democratically chosen, as documented above, councils are therefore also becoming larger in size due to exposure to conflict. Again, putting this finding into context, conflicts explain $\frac{0.452014 \times 2.360}{5.5008} \times 100 \approx 20$ percent of the increase in council size over the period 1200-1750.[29]

Conflict Intensity and Division of Power

As a final measure of the quality of local political institutions, we consider a measure of the division of power between administrative branches in a city. In particular, if executive or judiciary branches also gain influence in the council, then the council's

[28]For the modern era, see Kjaer and Elklit (2014) for an empirical test of the relationship between assembly size and representativeness.

[29]In our sample over the period 1200-1750, the average council size is 5.5008, the average conflict intensity is 2.36 percent and our estimation of the effect of conflict intensity on council size is 0.452.

independence (and therefore its ability to represent citizens effectively) is jeopardised. To this end, we construct an indicator equal to one if a mayor, sheriff or judge is part of the city council and thereby lessens the division of power within the city.

Results from this exercise are reported in Table 3.5. The OLS regressions in columns 1 and 2 are once again likely to bias the estimated coefficient towards zero, so we immediately turn to the instrumental variables results in columns 3- 6. Coefficients are stable with the successive inclusion of controls, and are negative and statistically significant (or just-insignificant at conventional levels in the richer specifications). This suggests that conflict exposure also improves the representativeness of political institutions by making councils more independent of other local political interests. Taking the estimate from column 6, a one percentage point increase in conflict intensity decreases the likelihood of overlap into the council by 19.6 percent relative to the mean.

Over the sample period 1200-1750, the probability that a city had a council with overlaps from other branches of administration rose by 16.465 percent. Using our estimate for the effect of conflict intensity on overlaps and the mean conflict intensity, conflicts over this period increased council independence by $0.0165 \times 2.360 \approx 3.89$ percent. Hence, in the absence of wars, council independence would have decreased by an additional $\frac{3.89}{16.465+3.89} \times 100 \approx 24$ percent over this period.

3.4.3 Conflict Intensity and Local Fiscal Capacity

Does the increased democratisation of political institutions come with a greater ability to tax citizens? Due to data availability, we collected taxation outcomes only for the subsample of cities in Bairoch et al. (1988). Table 3.6 shows the results of regressing the number of taxes levied by rulers in these cities on conflict intensity. Since these tax regressions also suffer from similar endogeneity concerns as the political institution regressions above, we again instrument for conflict intensity using the centrality of German nobles. In order to implement our instrumental variables framework, however, nobility data from all cities are required in order to capture the complete network of German nobility and therefore accurately predict conflicts in a first stage. For this reason, we use the two-sample 2SLS (TS2SLS) estimator, which estimates the first stage in the entire sample and then uses the predicted conflict intensity values to estimate the second stage using the Bairoch subsample (Pacini and Windmeijer, 2016). These results are reported in Table 3.7.[30]

For both the OLS and the TS2SLS regressions, we report the contemporaneous effect of conflict on taxation in period t in the top panels. The bottom panels show the long-term coefficient in decade $t+5$ (fifty years later). This is because the short- and long-term response of the tax system to violence can be different. In the short run, the effect of the conflict (which in our data are mainly defensive in nature) may disrupt the system and lower the potential to tax due to destruction. In this case, the total number of taxes levied would decrease.

Indeed, the results in Table 3.7 show a negative effect of conflict on the number of in the short run. Notably, however, our measure of tax sophistication (the share of sophisticated taxes among all taxes levied by the city) *increases* in response to conflict, as reported in column 2. Strikingly, therefore, while conflict disrupts local systems of taxation, it directs efforts to tax into relatively more sophisticated methods. This result is robust to alternative specifications of the share: in column 3, we include general taxation in the denominator,[31] and in column 4 we treat business taxes as sophisticated.

While it is possible that a conflict may have been so severe as to send a city on a permanently lower growth trajectory, it can also have acted as an incentive to improve systems of taxation. Forward-looking rulers may seek to further develop

[30] We also estimate regressions for local political institutions for this subset of cities. As in the taxation regressions, the analysis relies on the TS2SLS estimator in order to construct the first stage using the whole sample. Results are reported in Table 3.9 in the Appendix. Effects are in line with those found for the full sample, though the magnitude of the effects is larger.

[31] General taxes have no direct interpretation as these are mainly an unlabelled kitchen-sink category. This happens when the text in the *Städtebuch* mentions the introduction of a *tax* but without naming the tax or describing its purpose any further.

the tax system in order to raise more funds for defence in the future, in particular by developing more sophisticated means of taxation to offset distortions created by an increased tax burden. Conflicts therefore potentially act as pressure to improve the available taxation technology.

Our results bear out this hypothesis. The patterns in Table 3.7 suggest that, in the long run, conflict negatively impacts the absolute number of taxes, but with simple taxes being replaced by increasingly sophisticated methods of taxation. As a result, in the decades following periods of conflict, cities' tax systems stabilise at significantly higher levels of sophistication. Previous work notes this relationship for modern *national* systems of taxation (Besley and Persson, 2009). Our findings suggest that similar pressures also shaped *local* fiscal capacity in much earlier time periods.[32]

Concretely, our baseline measure of tax sophistication rose by 16.341 percent percent over the period 1200-1750. Using the mean conflict intensity and our estimate for the impact of conflict on tax sophistication, conflicts explain $\frac{3.913 \times 2.360}{16.341} \times 100 \approx 57$ percent of this increase.[33]

3.4.4 Robustness Checks

To assess the robustness of our results, we next relax assumptions made on the assignment of borders, the assignment of the conflict variable to the city- rather than the territory-level, the definition of the instrument, and the sample composition regarding the treatment of cities located in the so-called *small states* category. Results from these robustness exercises are reported in the Appendix.

[32]To explore what drives the increase in the share, we investigate the effect on the number of simple and sophisticated taxes separately. In the short run, conflict reduces both types of taxation, but simple forms of taxation fall much more sharply, therefore driving up the share of sophisticated taxes. In the long run, conflict reduces the number of simple taxes, while *increasing* the number of sophisticated taxes.

[33]Using an alternative measure of sophisticated taxes (which includes general taxation as a 'simple' tax), conflicts explain $\frac{1.042 \times 2.360}{7.4811} \times 100 \approx 33$ percent of the increase in tax sophistication.

Conflict Intensity Using Fixed Territorial Borders

Tables 3.10 and 3.11 report results for political institutions and tax outcomes with conflicts assigned using fixed borders. Since border changes are potentially endogenous to conflicts, we fix the border definition to territorial histories.[34] This means that we only consider borders that only contained the same set of cities over the sample period. The results are almost identical with the benchmark results which is true for both the political institutions as well as the tax outcomes.

Conflict Exposure at the City Level

So far, we have assigned conflicts at territory levels. The reasoning behind this is that cities' decisions depend not only on actual conflict, but on the threat of conflict (for which the overall conflict intensity of the territory is a good measure). Are the effects of conflicts different when measured at the city level? To test this, in Table 3.12 we measure conflict at the city level: the conflict treatment is now an indicator taking a value of one if the city is exposed to conflict in a given decade. At first, these coefficients appear to be much larger. However, since conflicts at the city-level are now measured as an indicator variable, experiencing a conflict corresponds to an increase in the previously used conflict intensity measure from 0 to 100 percent. For this reason, when the effect is normalised with respect to the mean, it is comparable to the benchmark results presented above.

Different Nobility Centrality Instruments

To probe for the robustness with respect to the definition of our instrument, we consider the following changes in defining the nobility centrality instrument. First, instead of taking the maximum centrality of nobles in a territory we consider the

[34] With time-varying borders, a concern could be that periods of warfare both increase the numerator (more cities in a territory see conflict) and lower the denominator (territories lose cities) of the conflict intensity measure. This would cause us to systematically overstate conflict intensity. Fortunately, our results are almost identical when using fixed borders, suggesting that this is not a major concern.

average centrality in Table 3.13. The most connected noble is important for determining the relationship between network centrality and conflicts, as shown in the benchmark results. However, it is possible that several influential individuals also drive this relationship, which would not be picked up when considering only the most well-connected noble. The results reported in Table 3.13 are statistically indistinguishable from the benchmark results.

The creation of links in a network is a potential choice of nobles. In our benchmark estimates, we control for changes in centrality stemming from nobles' immediate links by controlling for their degree centrality. A further check to shut down this channel is to consider nobles' network neighbours directly. In Tables 3.14 and 3.15 we use the maximum and average connectedness of a nobles' intermediate neighbours in the network. We call these neighbours *linked nobles*. A reduction in a noble's *neighbour's* centrality is unlikely to be the noble's own choice, but might still affect his or her conflict exposure.[35] The results in Tables 3.14 and 3.15 are similar to the benchmark results both in terms of the first and the second stage results. The choice of which nobles to use with respect to the formation or breaks of their networks therefore does not appear to substantially affect our results.

Keeping Cities in 'Small States'

As described in Section 3.3 above, our benchmark estimates omit cities in small 'Small States of the Holy Roman Empire' following Cantoni et al. (2018). Table 3.16 repeats the main analysis on the political institution outcomes including these cities. The signs of all coefficients remain unchanged, although the magnitude and significance for the council size and division of power outcomes drop. This is likely due to the noise added by the small state cities for which border assignments cannot be accurately made.[36] The result on citizens electing their council following a conflict

[35]Through mutual assistance pacts where a noble has to help in their neighbour's defence or military campaign, for example.

[36]In particular, it becomes less straight-forward to determine which cities truly belong to the same territory, hence including these cities introduces measurement error in the conflict variable.

is as before. The results are therefore not entirely explained away by the inclusion these cities, yet the results confirm our reasoning for excluding them from the main estimation sample.

Dropping Individual Centuries

Finally, we test for the sensitivity of our results to events in specific centuries by repeating the political institution regressions while excluding each century one-by-one. The results are reported in Table 3.17, where each panel represents one of the three political institution outcomes, and each column shows the omitted century in a given regression. Results are mostly stable, significant and comparable to the main results for almost all of the excluded centuries. The only period which has a marked impact on our results is the seventeenth century in column 5 without which results not only become significantly larger but also noisier.

3.5 Concluding Remarks

We take a novel perspective on the rise of inclusive political institutions and state capacity by looking at the local level over 550 years. At the local level, participation of different groups in political institutions pre-dates the rise of regional or national assemblies, and can be considered one precursor on the way to more inclusive institutions at all levels of governance. Using novel city-level data from the German lands, we she new light on the causal link between warfare and local political institutions and (local) fiscal capacity.

We combine city-level information on battles, existence and features of city councils, as well as various tax types, with rich data on the centrality of German nobles in the wider European nobility network. A reduction in the centrality of nobles following changes in the structure of the nobility network leads to a greater conflict intensity in the affected territories. Higher conflict intensity, in turn, shifts towards more sophisticated taxes, confirming (Tilly, 1990) hypothesis that warfare underpins the expansion of the fiscal capacity of states. Furthermore, we show that conflict had important effects on early forms of local democratisation: councils increasingly were elected by citizens, were larger in size, and were more likely to be independent of other institutions as a result of episodes of conflict. This is consistent with there being an often-hypothesised tradeoff: in order to expand the fiscal capacity of their polities to fund wars, rulers had to make concessions to their subjects by democratising political institutions.

Taken together, these results paint a clear picture of the central role of warfare in shaping the course of development in the German lands.

3.6 Tables

Table 3.1: Summary statistics

Panel A: Full Sample	Obs.	Mean	St. Dev.	Min	Max
Has executive	33076	0.47	0.50	0	1
Has judiciary	33076	0.13	0.34	0	1
Has council	33076	0.44	0.50	0	1
Council elected by citizens	33076	0.02	0.15	0	1
Council elected by citizens (cond. on having council)	14453	0.05	0.22	0	1
Council size	33076	3.91	8.66	0	341
Council size (cond. on having council)	14453	8.79	11.27	0	341
Exec. or judic. overlap with council	33076	0.11	0.32	0	1
Exec. or judic. overlap with council (cond. on having council)	14453	0.26	0.44	0	1
Share of cities in territory involved in conflict (%)	33076	2.32	6.05	0	100
Harmonic centr. of best-connected noble in territory	33076	22.38	27.08	0	148
Harm. centr. of best-conn. noble in terr. (cond. on having nobles)	28438	25.69	27.54	0	148
Average degree centr. of nobles in territory	33076	0.26	0.56	0	13
Av. degree centr. of nobles in terr. (cond. on having nobles)	28438	0.30	0.59	0	13
Panel B: Bairoch Sample					
	Obs.	Mean	St. Dev.	Min	Max
Has executive	4760	0.68	0.47	0	1
Has judiciary	4760	0.22	0.41	0	1
Has council	4760	0.70	0.46	0	1
Council elected by citizens	4760	0.04	0.20	0	1
Council elected by citizens (cond. on having council)	3331	0.06	0.24	0	1
Council size	4760	10.61	15.91	0	341
Council size (cond. on having council)	3331	14.98	17.17	0	341
Exec. or judic. overlap with council	4760	0.24	0.43	0	1
Exec. or judic. overlap with council (cond. on having council)	3331	0.34	0.47	0	1
Share of cities in territory involved in conflict (%)	4760	2.40	6.25	0	100
Harmonic centr. of best-connected noble in territory	4760	21.55	27.28	0	148
Harm. centr. of best-conn. noble in terr. (cond. on having nobles)	3885	26.18	28.02	0	148
Average degree centr. of nobles in territory	4760	0.36	0.83	0	13
Av. degree centr. of nobles in terr. (cond. on having nobles)	3885	0.44	0.90	0	13
Total number of taxes	4760	1.31	2.03	0	14
Number of simple taxes	4760	0.95	1.45	0	11
Number of sophisticated taxes	4760	0.22	0.59	0	4
Ratio sophisticated : simple taxes	1350	38.58	70.25	0	400

Note: The full sample (Panel A) covers the 1472 cities in the *Städtebuch* that are not in a 'Small State of the Holy Roman Empire' in the *Euratlas* at a decadal basis over the period 1200-1750. The Bairoch sample (Panel B) covers the subset of cities also in Bairoch et al. (1988). Variables are defined as follows. **Political institution variables**: 'Has executive' is a binary variables equal to one if the city has a mayor or sheriff. 'Has judiciary' is a binary variable equal to one if the city has a judge. 'Has council' is a binary variable equal to one if the city has a council. 'Council elected by citizens' is a binary variable equal to one if the city has a council which is elected by citizens without the interference of the local lord. 'Council size' is a count variable of the number of members on the council. 'Exec. or judic. overlap with council' is a binary variable equal to one if the mayor, sheriff or judge is a council member. **Conflict variables**: 'Share of cities in territory involved in conflict' is the count of cities in the territory involved in conflict divided by the total number of cities in territory. **Nobility variables**: 'Harmonic centrality of best-connected noble in territory' is the maximum harmonic centrality observed for a noble associated with the territory (see text for details on calculating harmonic centrality. 'Average degree centr. of nobles in territory' is the average number of links that nobles in the territory have to other nobles. **Taxation variables**: 'Total number of taxes' is a count of the taxes that are active in the city. 'Number of simple taxes' and 'Number of sophisticated taxes' break these down into two distinct classifications (see text for a discussion). 'Ratio sophisticated : simple taxes' divides the number of sophisticated taxes by the number of simple taxes.

Table 3.2: First stage - nobility centrality and conflict

	Dependent Variable: Conflict Intensity (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Max. Harmonic Cent.	-0.013***	-0.013***				
	(0.004)	(0.004)				
Avg. Harmonic Cent.			-0.015***	-0.015***		
			(0.005)	(0.004)		
Max. Harmonic Cent. (Linked Nob.)					-0.012***	-0.012***
					(0.004)	(0.004)
Degree Centrality		-0.034		-0.016		-0.046
		(0.171)		(0.165)		(0.173)
Observations	33,076	33,076	33,076	33,076	33,076	33,076
Territories	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472
Outcome mean	2.182	2.182	2.182	2.182	2.182	2.182

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma \text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles within the wider European nobility network (see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.3: Second stage - conflict and council elections

	Dependent Variable: Citizens Elect Council (1 = yes)					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	IV	IV	IV	IV
Conflict Intensity t-1 (%)	0.000	0.000	0.004*	0.003*	0.003*	0.003*
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)
Council Present (1=yes)		0.028***		0.028***		0.028***
		(0.008)		(0.008)		(0.008)
Degree Centrality					-0.001	-0.001
					(0.003)	(0.003)
Observations	33,076	33,076	33,076	33,076	33,076	33,076
Territories	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472
Outcome mean	0.024	0.024	0.024	0.024	0.024	0.024
Kleibergen-Paap F stat			10.213	10.183	10.322	10.272
$\beta \times 100/$(outcome mean)			14.906	14.146	13.918	12.616

Note: OLS and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). Council Present is an indicator variable taking a value of one if a council is present in the city. Degree Centrality measures a territory's nobles' direct links to other nobles. All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.4: Second stage - conflict and council size

	Dependent Variable: Size of Council					
	(1) OLS	(2) OLS	(3) IV	(4) IV	(5) IV	(6) IV
Conflict Intensity t-1 (%)	0.010	0.009	0.452*	0.412**	0.370*	0.301*
	(0.009)	(0.007)	(0.240)	(0.201)	(0.210)	(0.163)
Council Present (1=yes)		6.169***		6.146***		6.162***
		(0.455)		(0.444)		(0.447)
Degree Centrality					-0.233	-0.315
					(0.243)	(0.212)
Observations	33,076	33,076	33,076	33,076	33,076	33,076
Territories	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472
Outcome mean	3.229	3.229	3.229	3.229	3.229	3.229
Kleibergen-Paap F stat			10.213	10.183	10.322	10.272
$\beta \times 100/(\text{outcome mean})$			14.000	12.757	11.466	9.336

Note: OLS and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta\text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Council Size is a count variable of the number of members of the city council. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). Council Present is an indicator variable taking a value of one if a council is present in the city. Degree Centrality measures a territory's nobles' direct links to other nobles. All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.5: Second stage - conflict and division of power

	Dep. Var.: Exec. or Jud. Overlaps with Council (1 = yes)					
	(1) OLS	(2) OLS	(3) IV	(4) IV	(5) IV	(6) IV
Conflict Intensity t-1 (%)	-0.000	-0.000	-0.016*	-0.018*	-0.013	-0.016
	(0.000)	(0.000)	(0.010)	(0.009)	(0.010)	(0.010)
Council Present (1=yes)		0.247***		0.248***		0.247***
		(0.046)		(0.046)		(0.046)
Degree Centrality					0.010	0.007
					(0.007)	(0.007)
Observations	33,076	33,076	33,076	33,076	33,076	33,076
Territories	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472
Outcome mean	0.081	0.081	0.081	0.081	0.081	0.081
Kleibergen-Paap F stat			10.213	10.183	10.322	10.272
$\beta \times 100$/(outcome mean)			-20.457	-22.464	-16.184	-19.613

Note: OLS and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). Council Present is an indicator variable taking a value of one if a council is present in the city. Degree Centrality measures a territory's nobles' direct links to other nobles. All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.6: Conflict and taxation - OLS

	Short-Run Effect on Taxes in t			
	(1)	(2)	(3)	(4)
	No. of all Taxes	Share of sophist. Taxes	Share of sophist. Taxes (alt.)	Share of sophist. Taxes incl. Business
Conflict Intensity t-1	-0.000	0.035	0.067	0.120
	(0.004)	(0.222)	(0.074)	(0.211)
Observations	4,760	1,336	2,142	1,336
Territories	96	53	71	53
Outcome mean	1.005	31.438	14.104	47.851
$\beta \times 100/$(outcome mean)	-0.005	0.112	0.477	0.250
	Long-Run Effect on Taxes in $t+5$			
	(1)	(2)	(3)	(4)
Conflict Intensity t-1	0.002	0.124	-0.009	0.229
	(0.003)	(0.156)	(0.041)	(0.177)
Observations	4,101	1,214	1,941	1,214
Territories	93	51	70	51
Outcome mean	1.055	31.872	14.334	48.118
$\beta \times 100/$(outcome mean)	0.179	0.389	-0.062	0.477

Note: OLS regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. No. of all taxes counts the total number of taxes levied in a city in a given decade. Share of sophisticated taxes is the share of sophisticated to simple taxes (see text for details). Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the city level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

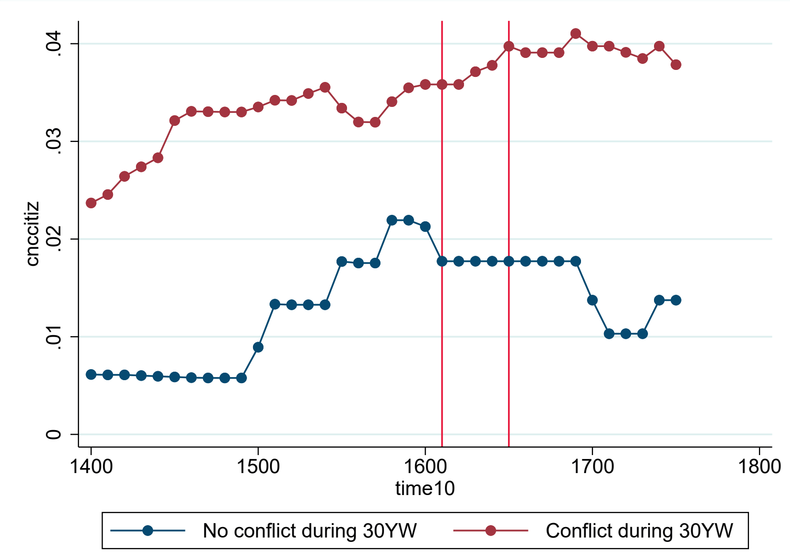
Table 3.7: Conflict and taxation - instrumental variables

	Short-Run Effect on Taxes in t			
	(1)	(2)	(3)	(4)
	No. of all Taxes	Share of sophist. Taxes	Share of sophist. Taxes (alt.)	Share of sophist. Taxes incl. Business
Conflict Intensity t-1	-0.105***	3.987***	1.064***	3.676***
	(0.021)	(0.493)	(0.189)	(0.402)
Observations	4,760	1,350	2,149	1,350
Territories	96	59	73	59
Kleibergen-Paap F stat	15.447	15.447	15.447	15.447
Outcome mean	1.005	31.438	14.104	47.851
$\beta \times 100$/(outcome mean)	-10.495	12.684	7.542	7.682
	Long-Run Effect on Taxes in $t+5$			
	(1)	(2)	(3)	(4)
Conflict Intensity t-1	-0.031*	7.827***	2.460***	11.047***
	(0.019)	(1.137)	(0.368)	(1.367)
Observations	4,112	1,230	1,957	1,230
Territories	96	60	75	60
Kleibergen-Paap F stat	15.447	15.447	15.447	15.447
Outcome mean	1.055	31.872	14.334	48.118
$\beta \times 100$/(outcome mean)	-2.960	24.559	17.163	22.958

Note: Two-Sample 2SLS regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. No. of all taxes counts the total number of taxes levied in a city in a given decade. Share of sophisticated taxes is the share of sophisticated to simple taxes (see text for details). Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the city level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

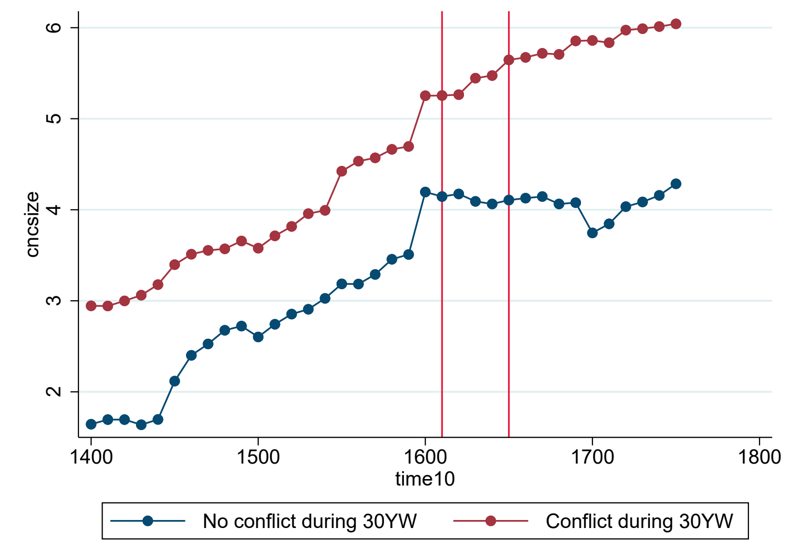
3.7 Figures

Figure 3.1: Involvement in the Thirty Years' War and citizens' elections of councils



Note: Evolution of probability that citizens elect council. Averages shown over time separately for those cities that did (red) and did not (blue) experience conflict during the Thirty Years' War (marked with vertical red lines).

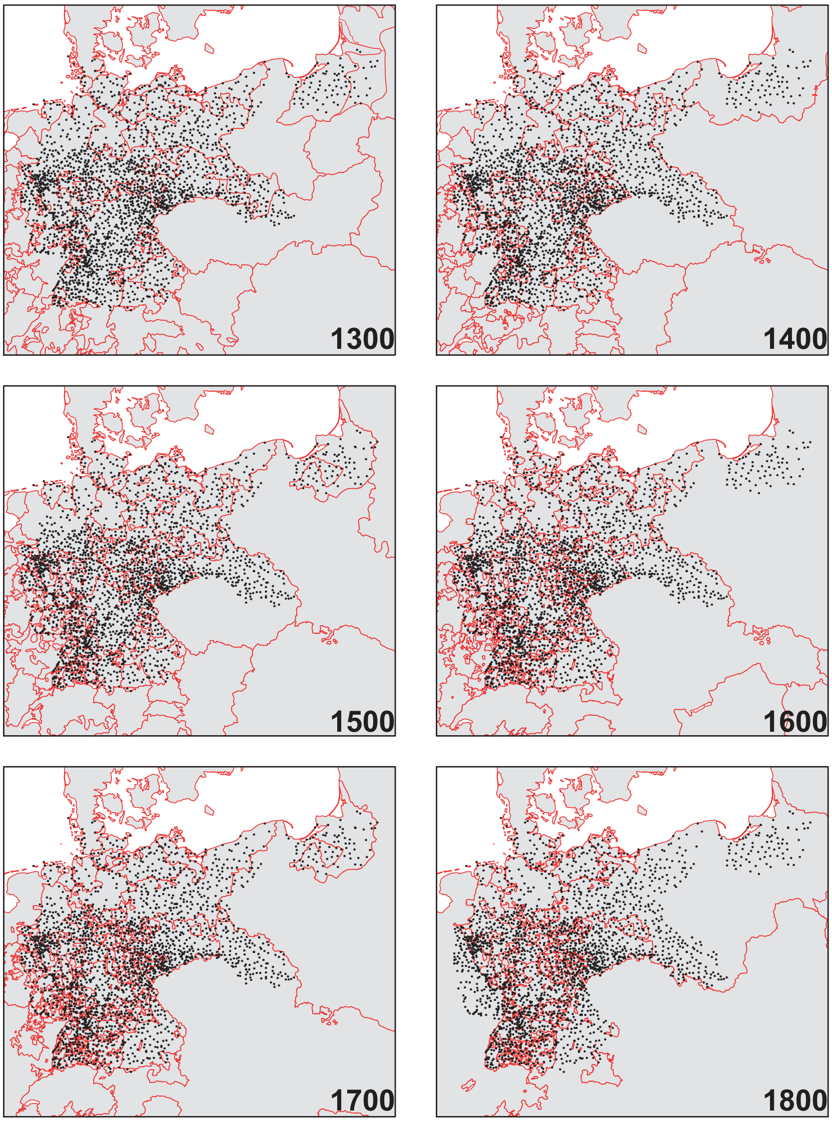
Figure 3.2: Involvement in the Thirty Years' War and council size



Note: Evolution of the size of the council. Averages shown over time separately for those cities that did (red) and did not (blue) experience conflict during the Thirty Years' War (marked with vertical red lines).

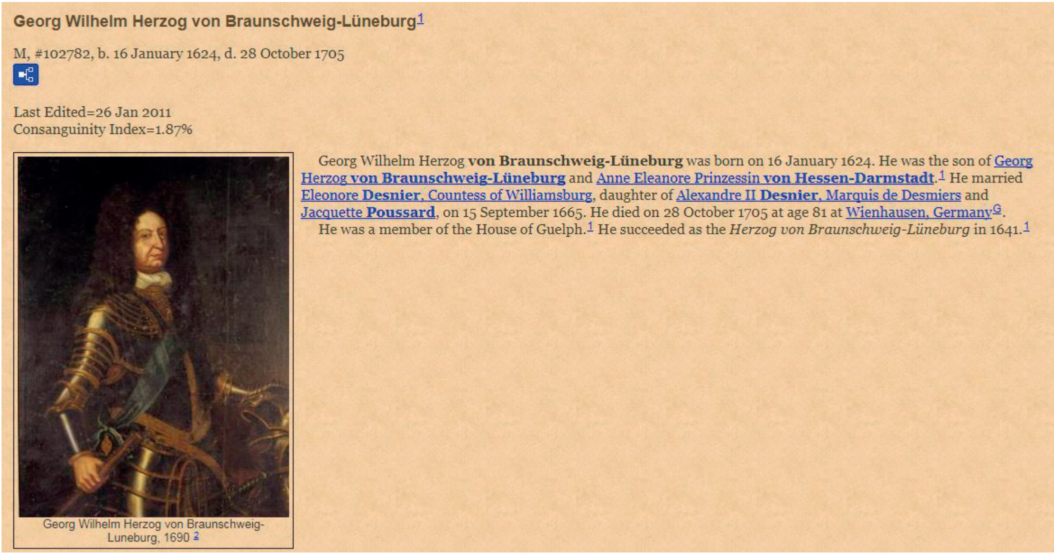
3.8 Appendix: Additional Tables and Figures

Figure 3.3: Sovereign territories in the German lands, 1300-1800



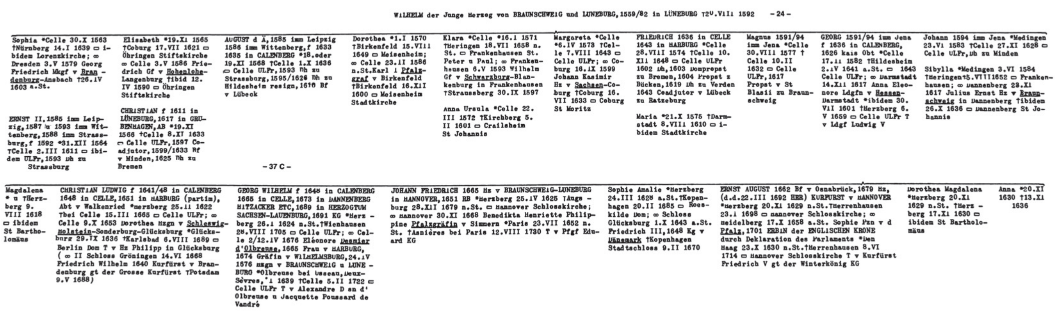
Note: Fixed locations of *Städtebuch* cities (black dots). Sovereign territories from *Euratlas* outlined each century (red lines). Sovereign territories are used to assign nobility network shocks and conflict intensity treatments to Keyser cities (see text for details).

Figure 3.4: The Peerage example



Note: Example from Darryl Lundy's genealogical website *The Peerage* (`http://www.thepeerage.com/`, accessed 04/11/2017) for Georg Wilhelm, Duke of Braunschweig and Lüneburg. Georg Wilhelm is one of the over 680,000 nobles we use to reconstruct the European nobility network each year (see text for details).

Figure 3.5: Family tree example - the Lords of Braunschweig and Lüneburg, 1582-1698



Tafel 25 **Die HERZOGE von BRAUNSCHWEIG und LÜNEBURG jüngerer Linie 1582-1698**

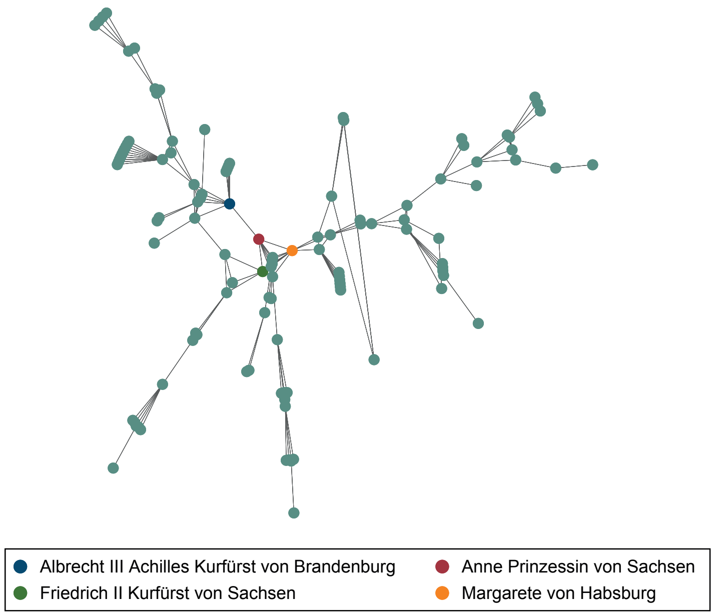
Note: Family tree example from the *Europäische Stammtafeln* (Schwennicke, 1998). Life events are represented by the following symbols for birth *, deaths †, marriage ⚭, burial ▭, battle deaths are marked by two crossed swords. We use these family trees primarily to associate nobles to cities and territories within the German lands, but also to supplement the information from the *Peerage*.

Figure 3.6: Family tree - individual entry

GEORG WILHELM f 1648 in CALENBERG
1665 in CELLE, 1673 in DANNENBERG
HITZACKER ETC, 1689 in HERZOGTUM
SACHSEN-LAUENBURG, 1691 KG *Herz -
berg 26.I 1624 n.St. †Wienhausen
28.VIII 1705 ▭ Celle ULFr; ∞ Cel-
le 2/12.IV 1676 Eléonore Desmier
d'Olbreuse, 1665 Frau v HARBURG,
1674 Gräfin v WILHELMSBURG, 24.IV
1676 Hzgn v BRAUNSCHWEIG u LUNE -
BURG *Olbreuse bei Usseau, Deux-
Sèvres, 'I 1639 †Celle 5.II 1722 ⊏
Celle ULFr T v Alexandre D sn d'
Olbreuse u Jacquette Poussard de
Vandré

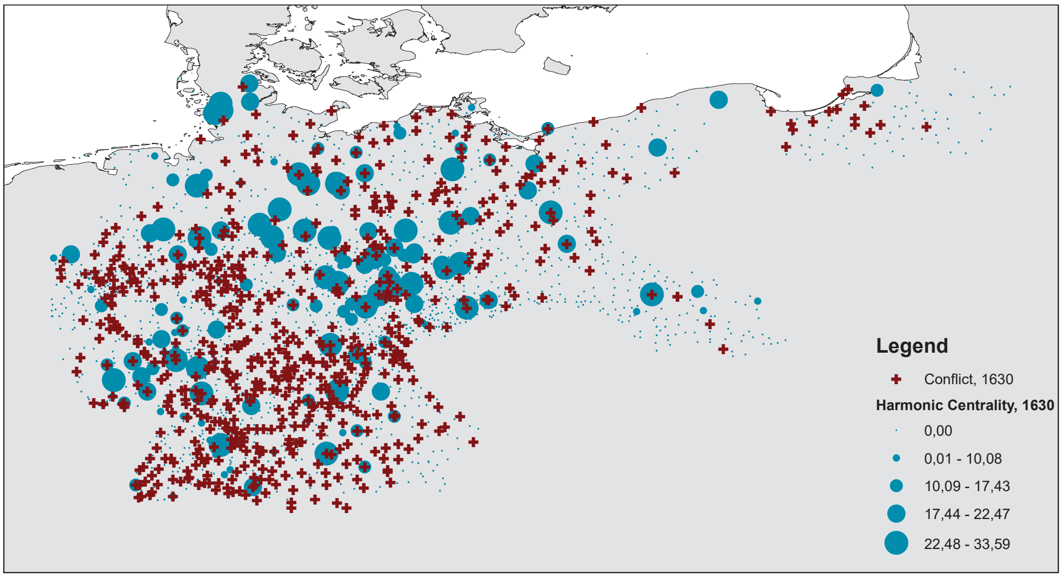
Note: Individual entry within a family tree (zoomed in) from the *Europäische Stammtafeln* (Schwennicke, 1998). The example shows Georg Wilhelm of the House of Braunchweig and Lüneburg. The most relevant information of the entry include the cities of residences and death, year of birth, marriage, and death, the name and title of his wife and her family (Eleonore Desmier d'Olbreuse).

Figure 3.7: Example nobility network and most central individuals, 1460



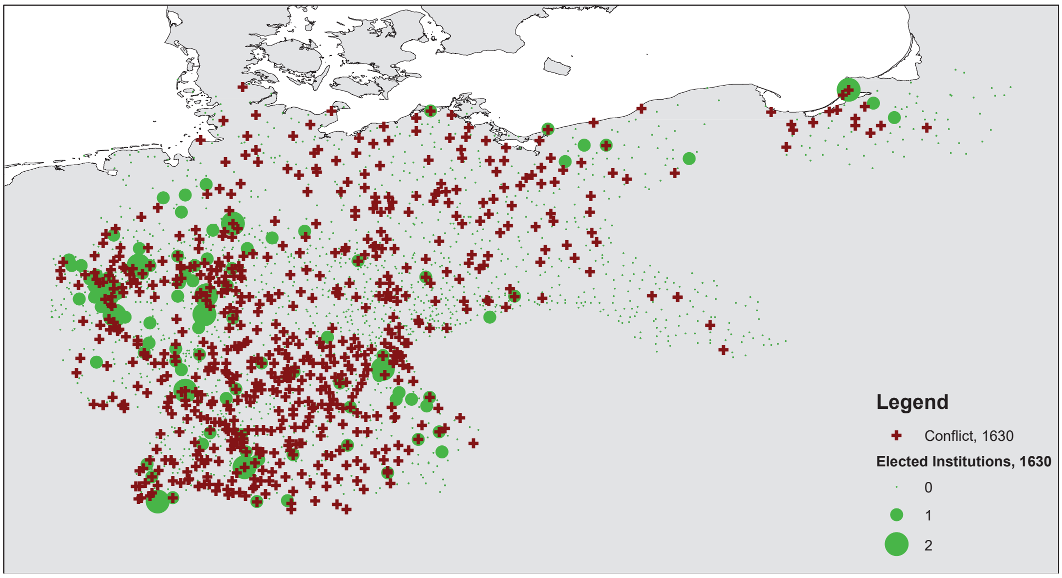
Note: An example of a nobility network in the year 1460 (only the largest component shown). The four most central individuals (as measured by harmonic centrality, see text) highlighted. Nodes positioned for visualisation purposes using multidimensional scaling (node positions therefore do not correspond, for example, to geographic locations of nobles).

Figure 3.8: Spatial distribution of city network centrality and conflicts



Note: Spatial relationship between cities' nobles' harmonic centrality and the occurrence of violent conflicts in the cross-section of 1630 in the German lands.

Figure 3.9: Spatial distribution of elected institutions and conflicts



Note: Spatial relationship between cities' exposure to conflict and institutions elected by citizens in the cross-section of 1630 in the German lands.

Table 3.8: Reduced form

	Dependent Variable:					
	Citizens Elect Council		Council Size		Council Overlaps	
	(1)	(2)	(3)	(4)	(5)	(6)
Max. Harmonic Centrality t-1	-0.005*	-0.004*	-0.551**	-0.398*	0.022*	0.021*
	(0.002)	(0.002)	(0.234)	(0.202)	(0.013)	(0.012)
Degree Centrality t-1		-0.001		-0.325		0.007
		(0.003)		(0.211)		(0.006)
Observations	33,076	33,076	33,076	33,076	33,076	33,076
Territories	157	157	157	157	157	157
Cities	1,416	1,416	1,416	1,416	1,416	1,416
Outcome mean	0.024	0.024	3.913	3.913	0.113	0.113

Note: Reduced-form regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Centrality}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Coefficients on Max. Harmonic Centrality (and corresponding standard errors) have been multiplied by a factor of 100. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Council Overlaps ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). Harmonic Centrality measures the centrality of a territory's nobles within the wider European nobility network (see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. All regressions control for the presence of a council. All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.9: Institutions results for Bairoch cities

	(1) Cit. elect Council	(2) Council Size	(3) Div. of Power	(4) Cit. elect Council	(5) Council Size	(6) Div. of Power
Conflict Intensity t-1	0.010***	0.764***	-0.036***	0.012***	0.235*	-0.034***
	(0.002)	(0.149)	(0.008)	(0.002)	(0.138)	(0.008)
Observations	4,760	4,760	4,760	4,760	4,760	4,760
Territories	96	96	96	96	96	96
Cities	196	196	196	196	196	196
Kleibergen-Paap F stat	16.073	16.073	16.073	14.993	14.993	14.993
Outcome mean	0.024	3.229	0.081	0.024	3.229	0.081
$\beta \times 100/(\text{outcome mean})$	40.150	23.675	-44.483	48.792	7.283	-42.379
Degree centr. control				Yes	Yes	Yes

Note: Two-Sample 2SLS regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.10: Institutions results with conflicts assigned at fixed territory borders

	(1) Conflict Intensity t-1	(2) Citizens elect Council	(3) Council Size	(4) Division of Power	(5) Conflict Intensity t-1	(6) Citizens elect Council	(7) Council Size	(8) Division of Power
Harmonic Centrality	-0.017***				-0.016***			
	(0.006)				(0.006)			
Conflict Intensity t-1		0.003*	0.335**	-0.015*		0.003*	0.251*	-0.013
		(0.001)	(0.164)	(0.008)		(0.001)	(0.135)	(0.008)
Council present (1=yes)		0.028***	6.117***	0.249***		0.028***	6.139***	0.249***
		(0.008)	(0.441)	(0.046)		(0.008)	(0.445)	(0.046)
Degree Centrality					-0.115	-0.001	-0.296	0.006
					(0.269)	(0.003)	(0.220)	(0.008)
Observations	33,081	33,081	33,081	33,081	33,081	33,081	33,081	33,081
Territories	157	157	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472	1,472	1,472
Kleibergen-Paap F stat		7.766	7.766	7.766		7.362	7.362	7.362
Outcome mean		0.024	3.229	0.081		0.024	3.229	0.081
$\beta \times 100/(\text{outcome mean})$		11.498	10.371	-18.252		10.483	7.760	-16.287

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma \text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$, and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles within the wider European nobility network (see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.11: Taxation results with conflicts assigned at fixed territory borders

	Short-Run Effect on Taxes in t			
	(1)	(2)	(3)	(4)
	No. of all Taxes	No. of simple Taxes	No. of sophisticated Taxes	Share of sophist. Taxes
Conflict Intensity t-1	-0.083***	3.156***	0.842***	2.909***
	(0.016)	(0.412)	(0.155)	(0.328)
Observations	4,760	1,350	2,149	1,350
Territories	96	59	73	59
Kleibergen-Paap F stat	13.911	13.911	13.911	13.911
Outcome mean	1.005	31.438	14.104	47.851
$\beta \times 100/$(outcome mean)	-8.307	10.039	5.969	6.080
	Long-Run Effect on Taxes in $t+5$			
	(1)	(2)	(3)	(4)
Conflict Intensity t-1	-0.025*	6.195***	1.947***	8.744***
	(0.015)	(0.991)	(0.309)	(1.199)
Observations	4,112	1,230	1,957	1,230
Territories	96	60	75	60
Kleibergen-Paap F stat	13.911	13.911	13.911	13.911
Outcome mean	1.055	31.872	14.334	48.118
$\beta \times 100/$(outcome mean)	-2.343	19.438	13.585	18.172

Note: Two-Sample 2SLS regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. No. of all taxes counts the total number of taxes levied in a city in a given decade. Share of sophisticated taxes is the share of sophisticated to simple taxes (see text for details). Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.12: Institutions results with conflicts assigned at the city level

	(1) Conflict t-1	(2) Citizens elect Council	(3) Council Size	(4) Division of Power	(5) Conflict t-1	(6) Citizens elect Council	(7) Council Size	(8) Division of Power
Harmonic Centrality	-0.000***				-0.000***			
	(0.000)				(0.000)			
Conflict t-1 (1=yes)		0.280*	33.343**	-1.466*		0.256*	24.807*	-1.314
		(0.147)	(16.222)	(0.807)		(0.148)	(13.377)	(0.832)
Council present (1=yes)		0.027***	6.043***	0.253***		0.027***	6.084***	0.252***
		(0.008)	(0.483)	(0.045)		(0.008)	(0.475)	(0.046)
Degree Centrality					-0.001	-0.001	-0.302	0.005
					(0.003)	(0.003)	(0.223)	(0.008)
Observations	32,895	32,895	32,895	32,895	32,895	32,895	32,895	32,895
Territories	157	157	157	157	157	157	157	157
Cities	1,471	1,471	1,471	1,471	1,471	1,471	1,471	1,471
Kleibergen-Paap F stat		7.953	7.953	7.953		7.543	7.543	7.543
Outcome mean		0.024	3.229	0.081		0.024	3.229	0.081
β /(outcome mean)		11.690	10.327	-18.200		10.675	7.683	-16.317

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma\text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$, and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta\text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict is an indicator taking a value of one if the city is involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles within the wider European nobility network (see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.13: Institutions results with IV defined as average harmonic centrality

	(1) Conflict Intensity t-1	(2) Citizens elect Council	(3) Council Size	(4) Division of Power	(5) Conflict Intensity t-1	(6) Citizens elect Council	(7) Council Size	(8) Division of Power
Harmonic Centrality	-0.015***				-0.014***			
	(0.004)				(0.004)			
Conflict Intensity t-1		0.004*	0.403*	-0.020*		0.003	0.278	-0.018*
		(0.002)	(0.208)	(0.011)		(0.002)	(0.171)	(0.010)
Council present (1=yes)		0.028***	6.147***	0.248***		0.028***	6.163***	0.247***
		(0.008)	(0.446)	(0.046)		(0.008)	(0.449)	(0.046)
Degree Centrality					-0.020	-0.001	-0.320	0.006
					(0.164)	(0.003)	(0.213)	(0.007)
Observations	33,076	33,076	33,076	33,076	33,076	33,076	33,076	33,076
Territories	157	157	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472	1,472	1,472
Kleibergen-Paap F stat		10.704	10.704	10.704		11.548	11.548	11.548
Outcome mean		0.024	3.229	0.081		0.024	3.229	0.081
$\beta \times 100/$(outcome mean)		15.088	12.486	-25.391		13.459	8.602	-22.473

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma \text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$, and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles within the wider European nobility network (see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.14: Institutions results with IV defined as harmonic centrality of linked nobles

	(1) Conflict Intensity t-1	(2) Citizens elect Council	(3) Council Size	(4) Division of Power	(5) Conflict Intensity t-1	(6) Citizens elect Council	(7) Council Size	(8) Division of Power
Harmonic Centrality	-0.014***				-0.014***			
	(0.005)				(0.005)			
Conflict Intensity t-1		0.003*	0.332**	-0.016*		0.002	0.247*	-0.014
		(0.002)	(0.167)	(0.009)		(0.002)	(0.139)	(0.009)
Council present (1=yes)		0.028***	6.117***	0.249***		0.028***	6.140***	0.249***
		(0.008)	(0.441)	(0.046)		(0.008)	(0.445)	(0.046)
Degree Centrality					-0.131	-0.001	-0.297	0.005
					(0.270)	(0.003)	(0.220)	(0.008)
Observations	33,081	33,081	33,081	33,081	33,081	33,081	33,081	33,081
Territories	157	157	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472	1,472	1,472
Kleibergen-Paap F stat		7.321	7.321	7.321		6.861	6.861	6.861
Outcome mean		0.024	3.229	0.081		0.024	3.229	0.081
$\beta \times 100/(\text{outcome mean})$		11.323	10.288	-19.694		10.283	7.654	-17.884

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma \text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$, and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles' network neighbours (*linked nobles*, see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.15: Institutions results with IV defined as average harmonic centrality of linked nobles

	(1) Conflict Intensity t-1	(2) Citizens elect Council	(3) Council Size	(4) Division of Power	(5) Conflict Intensity t-1	(6) Citizens elect Council	(7) Council Size	(8) Division of Power
Harmonic Centrality	-0.016***				-0.015***			
	(0.005)				(0.005)			
Conflict Intensity t-1		0.003*	0.340**	-0.017*		0.003*	0.254*	-0.015*
		(0.002)	(0.158)	(0.008)		(0.002)	(0.131)	(0.009)
Council present (1=yes)		0.028***	6.116***	0.249***		0.028***	6.139***	0.249***
		(0.008)	(0.445)	(0.046)		(0.008)	(0.449)	(0.046)
Degree Centrality					-0.114	-0.001	-0.294	0.005
					(0.263)	(0.003)	(0.222)	(0.008)
Observations	33,081	33,081	33,081	33,081	33,081	33,081	33,081	33,081
Territories	157	157	157	157	157	157	157	157
Cities	1,472	1,472	1,472	1,472	1,472	1,472	1,472	1,472
Kleibergen-Paap F stat		8.672	8.672	8.672		8.578	8.578	8.578
Outcome mean		0.024	3.229	0.081		0.024	3.229	0.081
$\beta \times 100/(\text{outcome mean})$		12.292	10.545	-20.808		11.334	7.861	-19.074

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma\text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$, and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta\text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles' network neighbours (*linked nobles*, see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.16: Institutions results without exclusion of small states

	(1) Conflict Intensity t-1	(2) Citizens elect Council	(3) Council Size	(4) Division of Power	(5) Conflict Intensity t-1	(6) Citizens elect Council	(7) Council Size	(8) Division of Power
Harmonic Centrality	-0.015***				-0.015***			
	(0.004)				(0.004)			
Conflict Intensity t-1		0.006**	0.219	-0.005		0.007***	0.207	-0.005
		(0.002)	(0.196)	(0.008)		(0.003)	(0.199)	(0.008)
Council present (1=yes)		0.043***	6.999***	0.270***		0.043***	6.999***	0.270***
		(0.010)	(0.467)	(0.033)		(0.010)	(0.467)	(0.034)
Degree Centrality					-0.039	0.002	-0.034	0.001
					(0.102)	(0.002)	(0.152)	(0.005)
Observations	51,382	51,382	51,382	51,382	51,382	51,382	51,382	51,382
Territories	208	208	208	208	208	208	208	208
Cities	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855
Kleibergen-Paap F stat		17.080	17.080	17.080		16.754	16.754	16.754
Outcome mean		0.024	3.229	0.081		0.024	3.229	0.081
$\beta \times 100/$(outcome mean)		25.858	6.795	-6.819		28.717	6.407	-6.284

Note: First stage regressions of the form $\text{Conflict}_{s,t-1} = \alpha_i + \lambda_t + \gamma\text{Centrality}_{s,t-1} + X'_{ist}\phi + \nu_{st}$, and IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta\text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade. Harmonic Centrality measures the centrality of a territory's nobles within the wider European nobility network (see text for details). Degree Centrality measures a territory's nobles' direct links to other nobles. Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.17: 2SLS institutions results excluding centuries one-by-one

	Panel A: Citizens Elect Council					
	(1)	(2)	(3)	(4)	(5)	(6)
	1200	1300	1400	1500	1600	1700
Conf. Int. t-1	0.002	0.004*	0.002	0.003*	0.019	0.004*
	(0.002)	(0.002)	(0.001)	(0.002)	(0.031)	(0.002)
Observations	30,422	28,733	28,061	25,683	24,784	27,662
Territories	156	155	153	150	136	140
Cities	1,461	1,441	1,447	1,414	1,365	1,358
K-P F stat	9.781	8.587	12.452	7.474	0.435	7.326
Outcome mean	0.026	0.025	0.023	0.022	0.022	0.022
$\beta \times 100/(\text{mean})$	8.464	14.243	9.961	15.119	88.494	16.948

	Panel B: Council Size					
	(1)	(2)	(3)	(4)	(5)	(6)
	1200	1300	1400	1500	1600	1700
Conf. Int. t-1	0.262*	0.380*	0.324**	0.372**	2.108	0.513**
	(0.154)	(0.194)	(0.161)	(0.185)	(3.227)	(0.254)
Observations	30,422	28,733	28,061	25,683	24,784	27,662
Territories	156	155	153	150	136	140
Cities	1,461	1,441	1,447	1,414	1,365	1,358
K-P F stat	9.781	8.587	12.452	7.474	0.435	7.326
Outcome mean	3.620	3.465	3.219	2.967	2.805	2.953
$\beta \times 100/(\text{mean})$	7.249	10.960	10.075	12.541	75.151	17.364

	Panel C: Division of Power					
	(1)	(2)	(3)	(4)	(5)	(6)
	1200	1300	1400	1500	1600	1700
Conf. Int. t-1	-0.019**	-0.018*	-0.012	-0.019**	-0.066	-0.018*
	(0.009)	(0.010)	(0.008)	(0.009)	(0.120)	(0.009)
Observations	30,422	28,733	28,061	25,683	24,784	27,662
Territories	156	155	153	150	136	140
Cities	1,461	1,441	1,447	1,414	1,365	1,358
K-P F stat	9.781	8.587	12.452	7.474	0.435	7.326
Outcome mean	0.091	0.089	0.081	0.075	0.068	0.071
$\beta \times 100/(\text{mean})$	-20.404	-20.176	-14.355	-24.910	-96.421	-25.265

Note: Each column re-runs the 2SLS analysis between the three institutional outcomes in panels A, B, and C, while dropping observations from a given century. The omitted century is specified in the column header and years refer to the beginning of a century, i.e. 1500 means 1500 to 1599. IV regressions of the form $y_{ist} = \alpha_i + \lambda_t + \beta \text{Conflict}_{s,t-1} + X'_{ist}\pi + \epsilon_{ist}$. Conflict Intensity (%) is the share of cities in a territory that are involved in conflict in a given decade, and is instrumented using the Harmonic Centrality of the most central noble in the territory (see text and Table 3.2 for details). Citizens Elect Council is an indicator variable taking a value of one if citizens of a city elect the council without the interference of the local lord. Council Size is a count variable of the number of members of the city council. Executive or Judiciary Overlaps with Council ('Division of Power') is an indicator variable taking a value of one if the executive or judiciary branches of city administration overlap with the council (see text for details). All regressions include city and decade fixed effects. Standard errors are reported in parentheses and are clustered at the territorial history level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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